Innovative Engineering Organizational Excellence Best Practices through capturing Tacit Knowledge: Evidence from Saudi Arabia

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ABSTRACT
This article studies the way tacit knowledge is dealt with in a high turnover business environment through a qualitative research approach in an engineering organization in Saudi Arabia with respect to organizational culture and values and the effect in competitive stance. The study found peer review process and managerial supervisory style to be effective in enabling new employees in a short time with knowledge critical for them to do a successful job, core values, and open door policy to be necessary factors in forming a fertile environment for a quick tacit knowledge harvesting. The study also showed that a good competitive stance and customer satisfaction can be achieved and maintained through implementation of an innovative peer review process. The study revealed that non-effective utilization of knowledge management technical resources was evident in the current study which may impact on achieving competitive advantage.

Keywords: competitive advantage; innovative knowledge management; culture; peer review; and tacit knowledge

1.0 Introduction

In the new era of business environment which is characterized by an increased turbulence and complexity, it was clear that an organization with unstructured approach to knowledge management was incapable of competing in the new business environment (Johannessen and Olsen, 2003; Davenport and Prusak, 2003). Therefore knowledge and knowledge management were perceived as an organizational resource (Holsapple and Joshi, 2000) and also important tools in achieving organizational excellence, performance and competitive advantage (Joia, 2007; Joia and Lemos, 2010) through knowledge transfer and sharing. Therefore knowledge transfer in an organization occurs when members of the organization pass tacit and explicit knowledge to each other. Information technology assists knowledge transfer by providing knowledge means for capturing, storing and retrieving. Knowledge that is in the domain of tacit requires that more context be captured with the innovative knowledge in which context is the information used to explain what the knowledge means and how it is used.

The speed of making tacit knowledge tangible is an issue in a high employee turnover environment. This is important especially when the process of engaging new engineers and project managers in designing projects is faster and the time for training new employees is limited. While it takes the organization time and effort to enable new employees with tacit knowledge necessary for them to do a successful job, knowledgeable employees emigrate to other organizations seeking better employment opportunities. The implementation of learning based systems development is a challenge for organizations as the basic training and education offered by them and the particular experiences of the individuals on their own and other factors such as fear and ignorance prevent such actions (Selamat and Choudrie, 2007). It is important for the development of people that we create a suitable organizational culture and infrastructure such that knowledge sharing is promoted. Literature reveals examples of effective learning communities and illuminates that even within one single company there is no one size fits all solution (Kohlbacher and Mukai, 2007).
All are considered good justification for this study to explore how innovative tacit knowledge can be handled in a high employee turnover engineering organization in Saudi Arabia, what are the cultural values that can help the organization to achieve the mission of tacit knowledge management as there are no research has been performed in this area with the Kingdom of Saudi Arabia.
2.0 Literature Review

2.1 Knowledge management

Recently the rise of the knowledge economy has created new challenges for organizations and made managing intellectual capital an integral part of the firm’s strategy, thus making the creation, development and capturing of value from knowledge a critical issue in today’s competitive environment. The rise of knowledge is due to the fact that not much knowledge is documented and it disappears from the organizations’ knowledgebase when staff members leave the organization (Sirianukul, 2009; Passerini, 2007). In understanding knowledge further, knowledge usually resides embedded in various types of forms including records, documents, procedures, processes, databases, routines and practices. Recently organizations started to realize that knowledge could be about diverse organizational aspects such as products, processes, customers, employees, partners, competitors, and good and bad experiences. Knowledge is classified into tacit and explicit (see table 1 for a comparison), where explicit knowledge refers knowledge that is easy to communicate.

Table 1: Differences between Explicit and Tacit Knowledge

<table>
<thead>
<tr>
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<th>Explicit Knowledge</th>
<th>Tacit Knowledge</th>
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<tbody>
<tr>
<td><strong>Nature</strong></td>
<td>• Easily identifiable</td>
<td>• Within person knowledge</td>
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<tr>
<td></td>
<td>• Relatively easy to share</td>
<td>• Difficult to articulate</td>
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<tr>
<td></td>
<td>• Intrinsically incomplete, lacks context and requires</td>
<td>• Hard to share</td>
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<tr>
<td></td>
<td>interpretation</td>
<td>• Can be shared only indirectly</td>
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<tr>
<td><strong>Typical Examples</strong></td>
<td>• Information</td>
<td>• Intuition and insight</td>
</tr>
<tr>
<td></td>
<td>• Know-that</td>
<td>• Practical intelligence, skills and</td>
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<td></td>
<td>• Theoretical knowledge</td>
<td>practice</td>
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<tr>
<td><strong>Mechanisms for</strong></td>
<td>• Codification</td>
<td>• Know-how and heuristics</td>
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<tr>
<td>generating and</td>
<td>• Documentation</td>
<td>• Rules of thumb</td>
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<tr>
<td>sharing**</td>
<td>• Databases and search engines</td>
<td>• Mental models and beliefs</td>
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<td></td>
<td>• Blogs, wikis and intranets</td>
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(Source: Goffin et al., 2010: 41)

Seubert et al. (2001) defined explicit knowledge as that which can be captured and expressed in words and numbers and shared in the form of data by courses or books for self reading, scientific formulae, specifications, manuals and the like. This kind of knowledge can be readily transmitted between individuals formally and systematically. Tacit knowledge refers to a knowledge which is only known by an individual and that is difficult to communicate to the rest of an organization. Nonaka and Konno (2000) add that tacit knowledge is deeply rooted in an individual’s actions and experience, as well as in the ideals, values or emotions he/she embraces. It has two dimensions where the first is the technical dimension, which encompasses the kind of informal personal skills or crafts often referred to as know-how. The second is the cognitive dimension, which consist of beliefs, ideas, values, schemata and mental models which are deeply ingrained in us which are often take for granted. While difficult to articulate,
this cognitive dimension of tacit knowledge shapes the way we perceive the world. Tacit knowledge is difficult to capture due to the fact that tacit knowledge is embedded in company practices and the people of an organization. It is highly personalized context sensitive and informal, and very hard to measure and manage. It includes know-how, intuition and informal communications that make up a large part of the company culture (Nonaka and Konno, 2000). However, Jennex (2007) views that what may be tacit to one person may be explicit to another. This fact has encouraged many researchers to recognize the importance of transferring tacit knowledge into explicit and stimulate studies on how to arm a broader spectrum of organization members with tacit knowledge. Therefore many organizations started to pay more attention to knowledge management to achieve competitive advantage (Jennex, 2007).

Many authors agree that knowledge management requires a total organizational transformation including organizational culture, structure and management style (Davenport and Prusak, 2000). Management entails all of those processes associated with the identification, sharing and creation of knowledge. This requires systems for the creation and maintenance of knowledge repositories and to cultivate and facilitate the sharing of knowledge and organizational learning. While Jennex (2005: iv) defined knowledge management to be the practice of selectively applying knowledge from previous experiences of decision making to current and future decision-making activities with the express purpose of improving the organization’s effectiveness. It can be highlighted that the goal of knowledge management in organizations is the creation of learning organizations that capable of measuring, storing and capitalizing on the expertise of employees to create an intelligent organization to secure its viability and overall success (Bollinger and Smith, 2001).

2.2 Knowledge management, organizational performance and learning organization

Knowledge management has became vital in organizations in today’s business environment due to the technological development, fierce competitive and globalization (Mundra et al., 2011; Chen et al., 2010; Zack et al., 2009) as the implementation of knowledge management tends to provide benefits such as enhanced way to organize existing corporate knowledge; productivity; making individuals more effective at sharing explicit knowledge; and providing new ways to expose tacit knowledge and in turn this will lead to competitive advantage as emphasized by Collins et al. (2010); Omerzel and Antoncic (2008); Wang et al. (2006); Leitch and Rosen (2001); Adam and Lamont (2003); Sharkie (2003); Huber (2001); Stewart (2001) and Carlucci (2004). In addition, achieving competitive advantages is based on knowledge assets and the manner which they are deployed Johannessen and Olsen, (2003).

2.3 Critical success factors of Knowledge management and organizational learning

Reducing costs, enhancing product or service quality, or creating value to customers are necessary business strategies for designing and implementing knowledge management in order to create competitive advantage (Ofek and Sarvary, 2001). Through the management of effective knowledge, learning become at the core heart of an organization, where increased available knowledge for decision making in aiding and sustaining competitive advantage. It is important to emphasize by implementing knowledge management and transferring tacit knowledge into explicit may not improve the organizational competitive advantage unless the organization becomes a learning society. In support of this further, English and Baker (2006) emphasized that every organization must search for and import best practices, learn/understand and share, create intellectual capital, and convert intellectual capital into value and profits.

Barna (2003) identified creating and promoting a culture of knowledge sharing within the organization and creating a learning organization. Creating a learning organization is identified as the main factor for successful knowledge management. That is in addition to articulating a corporate knowledge management vision, rewarding employees for knowledge sharing, creating communities of practice,
creating a best practices repository, obtaining senior management support, providing knowledge management training. Further, Yu et al. (2004) explored the linkage of organizational culture to knowledge management and found that knowledge management drivers such as a learning culture, knowledge sharing intention, rewards and team activity significantly affected knowledge management performance. In addition, the success or failure of knowledge sharing activities depends on how individuals and/or groups feel about the process, that is, the rumor mill shares knowledge highly effectively if not necessarily accurately because people enjoy the social activity and how they feel about the network of people with whom they are socializing in sharing knowledge (Smith, 2005). A successful implementation of knowledge management requires building the knowledge management approach to fit by linking sharing knowledge to solving practical business problems, tying sharing knowledge to a pre-existing core values, introducing knowledge management in a way that matches the organization’s style, building on the existing networks that people use in their daily work, and encouraging peers and supervisors to exert pressure to share (McDermott and O’Dell, 2001).

Other studies indicated several factors for the success of knowledge management such as the provision for knowledge creation, storage/retrieval, transfer and application, user motivation to share and use knowledge, leadership, top management support, the ability to identify, capture and transfer critical tacit knowledge, efficiency to facilitate the transference of tacit knowledge to new members, creating and promoting a culture of knowledge sharing management, creating communities of practice, and creating a best practices repository, creating a learning organization and creation of organizational memory (Jennex and Olfman, 2000; Holsapple and Joshi, 2000; Cross and Baird, 2000; Koskinen, 2001; Jennex and Olfman, 2002; Barna, 2003; Yu et al., 2004)

3.0 Research Problem and the Case Study

The speed of making tacit knowledge tangible is an issue in a high employee turnover environment. This is important especially when the process of engaging new engineers and project managers in designing projects is faster and the time for training new employees is limited. While it takes the organization time and effort to enable new employees with tacit knowledge necessary for them to do a successful job, knowledgeable employees emigrate to other organizations seeking better employment opportunities. The implementation of learning based systems development is a challenge for organizations as the basic training and education offered by them and the particular experiences of the individuals on their own and other factors such as fear and ignorance. Therefore it is important for the development of people that we create a suitable organizational culture and infrastructure such that knowledge sharing is promoted. All are considered good justifications for the current study in exploring how tacit knowledge can be handled in a high employee turnover engineering organization, what are the cultural values that can help the organization to achieve the mission of tacit knowledge management and what is the effect tacit knowledge may influence on the organization competitive stance. Therefore the focus of the study was a detailed investigation of organizational excellence best practices through capturing tacit knowledge in the Middle East through a case study in Saudi Arabia.

The selected organization specializes in engineering designs for the oil and gas sector. The organization handles different project types including process plants, refineries, pipelines, control systems, wastewater, and infrastructures. Performance of these projects is vital to the global economy as well as to the local because of the importance of the oil and gas sector plays worldwide. Schedule delays or design quality problems have direct impact in the rate of flow of oil and gas into the world market and therefore a diverse impact in the economy.

The organization employs mainly project managers and engineers as core staff in addition to support staff for non-engineering departments. Over the past 6 years, the organization has expanded rapidly to cope
with the demand and over the past two years, the organization acquired a leading company in the design of transmission and power projects and accomplished a major engineering software refurbishment to cope with market needs that emerged from oil prices increase. However the organization realized a continuous loss of experienced engineers and project managers and therefore a loss of critical knowledge needed for completion of current projects and for competition to new projects. This was due to staff transition from one job to another and migration from one country to another seeking better employment.

In sustaining its competitive within the current business environment, the organization establishes databases warehousing completed and current project information, engineering standards, repetitive design details, customer related processes, customer satisfaction/complaints records and organizational knowledge. Organizational knowledge was seen as a critical factor in sustaining competitiveness even with the high level of turnover witnessed in this organization.

4.0 Research Methodology

The current study focuses on how can tacit knowledge be captured, shared and transferred in a high turnover business environment and what are the cultural aspects and values that are necessary to prevail in a high turnover business environment to make tacit knowledge manageable. In achieving the objectives of the current study, unstructured in depth face to face interviews were conducted with key personnel, project managers, lead engineers and new employees for exploring the issues at hand. Interview questions were asked by the same interviewer and answers were hand recorded by the interviewer and two assistants. Answers gathered were confirmed by the interviewees to ensure correct understanding and that all information and details were accurately recorded and not missed out. The questions that were posed to the participants were open ended questions to gain a deeper understanding, and also reviews of corporate organizational and project records and procedures were also studied. In addition, observations of the researcher, been a participant, occupied a part in the setting. The utilized different techniques in collecting the data sources were explored in order to provide data triangulation and to lead to greater validity. The data were collected from 19 participants in the form of qualitative data.

5.0 Research Findings and Discussion

This section intends to explore the emerged four categories related to tacit knowledge in achieving organizational excellence, and competitiveness in an engineering firm in Saudi Arabia. The emerged categories are as follow:

**Category 1: Business Process** - The business process category embeds two elements concerned with tacit knowledge in the engineering design organization; the peer reviews as a mechanism in project execution process and secondly the process of incorporating captured knowledge into work procedures. The investigated organization uses the peer review process (see Figure 1), where independent review for work either by supervisor or by a senior colleague nominated by the supervisor.

The peer review process is implemented consistently in developing project designs that is in compliance with the client requirements, and through the implementation of the peer review process which indicates that process execution and knowledge sharing through procedures that were followed. In support of this further, an excerpt from design work procedure is highlighted where the lead engineer shall carry out or shall appoint a senior engineer to carry out a discipline peer review on a daily basis to ensure that engineer’s performance is in accordance with organizational practices, clients’ standards and requirements, business practices and is technically sound. Upon completion of a design package, the peer
reviewer shall provide a sign off copy of the design confirming his direct involvement in the stages through which the design has been accomplished. By following the peer review process where all participants gain knowledge throughout the process and gaining confidence to gear up with new business/projects. In support of this, interviews with four new engineers with less than one year experience with the organization stated that we were hesitant to pass three months probation when selected for recruitment with the organization, as it was a new industry to us. The peer review process has promoted our confidence and enriched our knowledge to take the right action. It offered us the chance to observe through actions and learn through experience and practice. The face to face interaction with our peers taught us what we would have not learned in years in our own.

Figure 1: A peer review model at project level

Another finding related to the context of business process is how knowledge has been exchanged, captured and deposited in database. The organization under investigation has developed and reserved a database for collecting and publishing knowledge. Supervisors and department managers can browse its contents through a shared drive. In support of this finding, the supervisor of the knowledge base stated that the organization is certified for quality management system 9001: 2000 and the system provides for a systematic incorporation of suggested ideas into the knowledge base for improvement and learning through a proposal; logging, review, approval, circulation and updating life cycle. The only few proposals received to add to the knowledge base were from exclusively department heads. Middle and bottom line employees are not motivated to pursue submitting proposals. It might be a good idea to include this issue to our criteria for selecting the best employee for monthly award. The project close out reports been prepared by project managers have provisions for proposals, but never been utilized.

Category 2: Managerial/supervisory practice - Managerial/supervisory practice category highlights the way a manager/supervisor distributes work to his subordinates, oversees their daily performance and guides them to resolve issues. This category highlights two elements that were practices in the investigated organization and they are the engineering/project manager daily interaction and filling the vacant lead positions from within the organization.

Tackling the first element where the engineering manager was the most senior function responsible for project performance and dealing with clients. A number of project managers handle projects under the supervision of the engineering manager. The engineering manager does not handle projects on his own, but oversees all projects to ensure quality, schedule and cost effectiveness. He keeps an eye on performance of all projects, reviews incoming correspondence prior to action by project managers and initials outgoing correspondence prior to issue by project managers. It was suggested that face to face communication with employees is a critical factor in sustaining and sharing knowledge to reduce client problems. In this regard, the engineering manager indicated that there is a need for close and deep face to
face involvement with project managers newly recruited to projects is critical. Although, the organization employs staff with ten years minimum experience for project management, project managers coming from other business environments showed lack for sense of contractual obligations, absence of documented commitments and financial impact. The close supervision and involvement have helped me remarkably reduce client problems with new project managers. I do nominal and procedural interaction with long term employed staff. Face to face communication with my subordinates offers me the chance to share and personalize experience. It is the practice been followed in all departments. I served this organization for more than a decade and my observation is valid throughout my career.

In support of face to face communication in sustaining and sharing knowledge through working together than on an individual basis, the human resource department tends to provide an orientation program to all new employees and issues every employee a wallet-size card with the company’s core values that read: we accomplish more together than we could do alone and are willing to do more than we receive. We challenge ourselves and will continually examine and raise our expectations. We respect our clients, our competitors, and the law. We respect and take pride in our firm and each other. We are loyal to our clients, our firm, each other, our profession, and our community.

The other element that was witnessed from the findings was the way the organization fills vacant lead positions. It is the management first choice to search within current staff for suitable candidates to fill those positions as a way of promoting knowledge transfer, sharing and dissemination to sustain competitive advantage. Individuals interviewed across the organization stated that the organization viewpoint is important for two reasons; it ensures maintaining project team’s moral and relations. We feel fear that we may not be in harmony with new leaders as some come with their own policies and agenda. The second, we think the organization should reward good performers, encourage, and motivate others to excel through promotion to upper positions. We believe in special cases when high skills are required.

**Category 3: Technical Resource** - Technical resource category focused on the provision of e-mail accounts, public employee network folders, knowledge database and internet access for sharing knowledge. The study identified several technological resources in support of business requirements for knowledge sharing such as e-mail accounts, databases, public folders, and internet access, employees’ public network folders in order to achieve competitive advantage. Folders were assigned to employees with limited capacity to share information for a limited time and not to be backed up. Elaborating further in support of the above, the organization was committed to enable employees with email accounts, each with a two-mega byte attachment capacity. Eighty four per cent of the participants stated that we appreciated providing e-mail facilities across the organization. Sometimes, we need to send drawing files to vendors or client in sizes more than permitted. This is a frustrating situation. However, the organization provides bigger bandwidth to senior people.

The organization designed a system for collecting and gathering lessons learned from each projects where the collected data will be stored in a database to be accessed by all employees for best practice. The lessons learned project comprises of two stages and they are collection and implementation where knowledge is collected and shared for organizational competitiveness. At the end of each project, project teams conduct collection workshops for capturing useful knowledge, so their significant positive and negative experiences can be made easily available for application to improve other projects. At the start of each project, the project teams conduct implementation workshops for selection of applicable existing lessons from the knowledge base to help new or ongoing project teams improve their performance.

This program has successfully improved project quality, reduced cost, and enhanced schedule. However it was highlighted that the program faces collection limitations as most of project teams are demobilized to other projects immediately when projects approach their end. By the time collection workshops are
held only few members remain available to participate and share their experience, thereby limiting workshops effectiveness. In support of this, an interviewed participant stated that databases been used by business units served analysis of performance and extracting information for planning for future business. We have concerns about the speed of extracting knowledge and transferring it into knowledge base. The best time to collect and extract lessons learned is during project lifetime. Most clients’ security policies call for destroying records when projects are closed. We lost the chance to capture, extract and register some lessons learned while the projects were live. The IT policies restrict direct access to databases only to senior staff while juniors were not permitted free search and browsing for confidentiality and control reasons.

**Category 4: Core Values** - Core values category intended to control the behavior of organizational employees among each other. The study identified a business environment within the investigated organization that was inspired by core values guiding staff towards mutual respect and personal relations maintenance. The co-author observed and discussed these identified core values with the participants for confirmation. These observations indicated that core values were displayed in offices, conference rooms and hallways. Top management and senior staff continuously recall the core values especially in public speeches and the company annual festivals. There is no historical track record of harassment or discrimination to race, color or sex. In support of this, eighty nine per cent of the respondents agreed with the above mentioned observations and ninety five per cent of them agreed with the following statement made by one of the respondents stating that the management adopts an open door policy whereby they listen to employees regarding different organizational issues. Employees across the organization have the liberty to discuss and exchange individual experience, ideas, emotions and values. The management does not respond to every issue raised through the open door policy.

### 6.0 Conclusion

This article explored how tacit knowledge can be handled in a high employee turnover engineering organization, and the culture values that can help the organization achieve the mission of tacit knowledge management. The findings indicate that tacit knowledge can be shared, exchanged and promoted between new and existing knowledgeable staff in a high employee turnover business environment. New employee can adapt into the organization culture and practices effectively and timely should a shield of an internal review process is created to ensure that performance is in line with customer expectations. A structured internal peer review facilities knowledge sharing and exchange between project teams and eliminates organizational dependence on a single employee’s effort that might put the business performance at risk. Therefore, an employee leaving the organization may not severely affect the knowledge assets of the company as most of us what transient workers know should have been exposed to other members through the review process. It is not enough for sharing tacit knowledge just to have staff get involved in peer review processes. The organization needs to have human relations maintained while they exercise such interactions.

People coming from different cultures and with ethnics background have different understanding and interpretations as well. Deployment of code of conduct, core values and open door policies within multicultural organizations forms strong grounds and fertile environments for tacit knowledge sharing. Another major conclusion regards the use of technological resource dedicated for knowledge management capturing, dissemination and codification for future use. It was obvious that the objectives were not fully met, as specific measurable goals were not set for resources to achieve. Literature reviewed indicated that knowledge management strategy that identifies users, sources, processes and storage is a key factor for success of knowledge management. This study concluded that the strategy should include objectives, timeline and responsibilities of innovative tacit knowledge management activities and resources. On a final note, sharing tacit knowledge through a well established organizational culture leads to a better competitive stance as evidence in the current study where the investigated organization has achieved several performance measures as a result of tacit knowledge.
References


Author’s Background

Prof. Hesham Magd is the Vice Chancellor and College of Business Dean, University of Buraimi, Oman. He has fifteen years of combined experience in traditional and non-traditional university teaching, academic training, community development, academic administration, curricula design, organizational change and development, distinguished research and scholarly writing, resulting in Honors, awards and recognition for academic excellence and outstanding achievement. He is the author and co-author of substantial publication records in published international journals and conference proceedings in the field of Quality management, ISO 9000 and Entrepreneurship. In addition, he serves on several international journal editorial boards and helped in developing and launching journal database platform in the Middle East. In his previous appointments throughout the world and current institution, he has been the driving force behind strategic institutional development during the time of profound change in the Higher Education. He has developed centers of excellences in supply chain management and entrepreneurship. Hesham has broad knowledge of the UK, USA, Middle East University Systems, Quality and accreditation systems (AACSB, ABET, OAAA, NCAA...), Budget control, faculty development and significant experience of University senior management and a public profile at senior academic level within the sector and also experienced in practical business through his involvement with business ownership, start up and organizational presidency board members and vice president position.