

2009 International Association of Computer Science and Information Technology - Spring Conference

## A Case Study on Knowledge Management Adoption in Mexico

David Joaquín Delgado-Hernández

Civil Engineering Department  
Autonomous University of the State of Mexico  
Toluca, México  
[david.delgado@fi.uaemex.mx](mailto:david.delgado@fi.uaemex.mx)

Sonia De-La-Torre-Rivera

Civil Engineering Department  
Federal Electricity Commission  
Mexico D.F., México  
[sonia.delgatorre@cfe.gob.mx](mailto:sonia.delgatorre@cfe.gob.mx)

Jesús Ismael Sánchez Velarde

Systems Engineering Department  
Occidental University  
Sinaloa, México  
[jisv18@hotmail.com](mailto:jisv18@hotmail.com)

Jesús Mario Castro Gutierrez

Systems Engineering Department  
Occidental University  
Sinaloa, México  
[cyvyc@hotmail.com](mailto:cyvyc@hotmail.com)

Kuan Yew Wong

Faculty of Mechanical Engineering  
Universiti Teknologi Malaysia  
Skudai, Malaysia  
[wongky@fkm.utm.my](mailto:wongky@fkm.utm.my)

Nelly Rigaud-Tellez

Mechanical and Industrial Engineering Department,  
National Autonomous University of Mexico  
Mexico D.F., Mexico  
[nerigaud@yahoo.com](mailto:nerigaud@yahoo.com)

Daniela Martínez Gaxiola

Systems Engineering Department  
Occidental University  
Sinaloa, México  
[danielishus@hotmail.com](mailto:danielishus@hotmail.com)

Efrén Ordoñez Aguilera

Computational Systems Engineering Department,  
Technological Institute of Comalcalco  
Tabasco, México  
[moicano70@hotmail.com](mailto:moicano70@hotmail.com)

Jessica Fabiola Mendiola

Systems Engineering Department  
Technological Institute of Culiacan  
Sinaloa, México  
[jessica\\_mendiola@hotmail.com](mailto:jessica_mendiola@hotmail.com)

### I. INTRODUCTION

**Abstract**— Organizations attempting to embark on the Knowledge Management (KM) journey need information, inputs, examples and role models from existing adopters or practitioners to help them adopt it. Hence, it is strongly believed that the growing research and literature in the KM domain should be more focused on its practical perspective. This paper represents a practical oriented work that reports on how a Mexican company has embraced KM. Specifically, key aspects such as knowledge activities, strategies, leadership, tools, systems, training, culture etc will be analyzed and described.

**Keywords** - Knowledge management; Mexico; Civil engineering

Researchers have widely studied and reported the theories, backgrounds and frameworks of Knowledge Management (KM) [1]. These theoretical studies have certainly provided very useful insights into its underlying concepts. However, the development and implementation of KM initiatives will also benefit from practical oriented research. Organizations attempting to embark on the KM journey need information, inputs, examples and role models from existing adopters or practitioners to help them deal with it [2]. It is believed that practical oriented research such as case studies could provide useful hints on how to ensure the successful deployment of KM.

Various case studies on the adoption of KM have been conducted in the advanced countries [3-7], but similar efforts in the developing regions are scarce [8]. This paper is aimed to report on the results of a case study conducted in a Mexican company. In this respect, the KM activities and strategies adopted by the company will be presented, followed by a description on other related issues such as management leadership, tools and systems, training and education, culture etc. It is hoped that this paper will provide an overview on the implementation of KM in a developing country, i.e. Mexico.

## II. CASE STUDY IN MEXICO (COMPANY A)

### A. Background

The case study was conducted in the Civil Engineering Division (CED) of a public Mexican organization in the power and electricity industry, with offices spread all around the country, attending 25.6 million of clients. Company A has 80,000 employees in total and the division visited has 2,000. The company works under six business streams: planning and building electricity infrastructure, generating, transmitting, controlling and distributing power. Being a support division, civil engineering takes part in practically all of them.

Over the last two decades, CED has participated in a wide variety of government and private projects covering five main areas: drinking water systems, environmental engineering, infrastructure protection studies, infrastructure design and supervision, and natural resources development. In the consultancy's market, CED's experience covers specialized services focused on infrastructure problem solving, and power generation. In this case, teamwork among its 20 constituent disciplines, grouped in six departments, has been a critical factor for succeeding. Its external clients include: Mexican Petroleum Company (PEMEX), National Water Commission, Mexican State Governments and some private companies.

The skills of its personnel have played an important role in the lately financial CED's growth (its turnover was 100 million USD in 2006, 110 million USD in 2007, and it was approximately 120 million USD in 2008). Since many of the most senior employees in the division will be retiring between 2009 and 2015, and based on a corporate strategy, CED started to implement a formal KM initiative in 2006. Its main objective, as will be seen, was to keep these people's experience inside the organization.

### B. Knowledge Management Activities

KM activities in CED are strongly related with those for Technology Management (TM) and Professional Development. There is a steering committee in which all six departments are represented by two members, one of them being the head of the department, and this group also includes the head of the division. The initiative to manage both knowledge and technology, stems from the fact that these two are required not only to have cost but also value

advantages in the highly competitive current marketplaces. Then, KM has been understood as a means to generate, disseminate and apply knowledge within the organization, which leads to improved processes' efficiency and income.

Additionally, KM is used to document and keep specialists' experiences in the company. The main thrust here is to improve the decision making process, based on the creation, transmission and application of knowledge previously utilized within the business. It is worth emphasizing at this point that, on average, the company specialists have 25 years of experience and, consequently, 70% of them will retire over the following 5 years. In fact, this is one of the reasons why the company started its KM journey.

The origin of the KM initiatives goes back to 1995, when internal "business units" were created to increase the division's productivity. Since, at that time, some of the tasks were being performed by two or more departments, a complete analysis of the processes and personnel activities was carried out. In the event, some employees could not continue working in the company. However, the old departments became units with clearly defined processes and positions. As a result of this re-engineering exercise, some experience was lost and the remaining people were given a training list which included the courses that they should take to provide the units' services with quality.

Apart from training, the program did not include more activities until 2004, when a knowledge center was created to electronically store staff's technical experiences. Each unit had the opportunity to put there the information that they considered as important. Finally, in 2006, a formal KM initiative was launched, which included data processing and knowledge structuring within a database that, with the respective access restrictions, can be consulted anytime by company employees. It is hoped that this journey will allow new generations of workers to learn from the experiences of their senior counterparts.

### C. KM Strategies

CED has developed a number of strategies to make the KM program effective. For instance, since the main purpose of the initiative is to acquire, share and disseminate knowledge, an intranet has been built. It contains a database used for improving internal communication. It also shows information about employees and their areas of expertise, meeting dates and memorandums, training program, and post profiles.

Professional development is also very important in CED. In general, personnel within the company have access to either internal or external training. Depending on their position, employees can attend technical or administrative courses, which are considered as an investment rather than as an expense. So, training is one of the main strategies to put KM into practice. This shows that Top Management is committed to KM, because they know that in the long term, people's knowledge will be translated into tangible and intangible benefits not only for the company but also for its workers.

#### D. Management Leadership and Support

Leadership is considered within CED as an important factor to successfully put any initiative into practice. In this sense, top managers are totally committed to implement KM, and they support new ideas and projects aimed at efficiently managing knowledge. Besides the financial support, senior managers provide both human and material resources to ensure that KM activities are practiced and monitored, because they know that these tasks contribute to improve the division's performance in terms of growth and profitability.

While there is not a specific KM group within CED, as already mentioned, there is a steering committee for managing technology, professional development and knowledge. It is important to note that all seven top managers belong to it. Their main role is to encourage people to acquire and apply new knowledge within the division, and to transmit it to the relevant areas.

The organizational structure lacks of positions specifically designed for dealing with knowledge. In spite of this, top management is planning to create them in the short term. It is hoped that people occupying these positions will be responsible for managing a great deal of information, and for codifying it in such a way that it can be systematically transmitted to key employees.

#### E. Tools and Systems

CED has a KM system, which is in the division's intranet, and contains aspects such as training programs, internal communication, career development, technology management activities and strategic planning initiatives. Moreover, making use of the soft and hard tools shown in Table 1, CED's staff have documented KM strategies, knowledge matrices, post profiles, training courses, technical experiences, technological diagnosis, codes of behavior, corporate policies, relevant internal regulations, memorandums and meeting dates.

This information is readily available to all employees in the division's KM system. There are, however, documents with restricted access that can be specially requested provided their use is totally justified. In addition, there is a center where technical reports are put so that interested personnel can consult them whenever they are needed.

to successfully implement such an initiative.

TABLE 1. KM TOOLS USED IN CED

| Hard tools                                | Soft tools                       |
|---|----------------------------------|
| Knowledge repository/base                 | Meeting and gathering            |
| Collaborative tool (email, messenger etc) | Project team/group               |
| Search engine (information retrieval)     | 'Community of practice'          |
| Content & document management system      | Presentation and sharing session |
| Knowledge portal                          | Benchmarking                     |
| Data mining                               | Mentoring                        |
| Workflow system                           | Job rotation                     |
| E-learning                                | Training (on/off job)            |
| Decision support system                   | Workshop                         |
| Directory of experts                      | Debriefing                       |

Again, there is a wide variety of tools used in CED for supporting the KM journey. It should be emphasized that their application is continuously improved, showing that CED is committed

#### F. Training and Education

Despite the fact that KM related training is still very limited in the organization, CED promotes courses and workshops where people are provided with new technical and administrative knowledge and experiences. In this sense, teamwork is encouraged during the courses as a means of integrating new employees to the company's culture. It is common for the workshops to be given by senior staff, to ensure that their experiences are passed to the new ones. Depending on the subject and number of attendants, training activities can be either internal or external.

#### G. Culture

In 2002, there was a campaign to document all knowledge within the division, the main thrust being to share it among all employees. Two years later, the process of systematically documenting experiences and technical information was already part of the internal culture. Currently, these activities are practiced on a daily basis.

In general, to promote a corporate culture, CED has a list of values, and codes of ethics and behaviors related to KM that can be consulted on the intranet. The former list has also been printed and it is located in all the company's work centers. This helps to make the staff aware of the conduct that should be observed in the organization.

Teamwork is the foundation of the internal culture, and quality is its main pillar, because understanding customers and their needs are critical factors to survive in today's competitive marketplaces. In addition, to embed creativity in the division's culture, CED offers incentive aids to those employees that propose and implement new ideas, including KM initiatives.

#### H. KM Implementation

The KM implementation process was not specifically designed. However, some stages were followed and are now summarized. The first step was for top management to recognize the need to put KM into practice within the company. Since one of the organizational critical aspects are knowledge and employees' experience, top management decided to start the KM journey. The next phase was to identify best practices in the departments, which in turn were proven in other departments by means of two pilot projects. When the projects were successfully completed, the initiative was expanded to other departments.

During the process, meetings for explaining and transmitting experiences in the execution of KM initiatives within the departments were organized. Having analyzed such experiences, top management selected the ones with the best results and encouraged their implementation in relevant departments. The process followed until all departments had adapted and adopted these practices.

Last but not least, top management has promoted a knowledge culture within the division. That is the reason

why KM activities are executed on a daily basis, and employees are aware that they should share their knowledge whenever it is possible. While fear to lose their positions has been an obstacle to make all workers take part in the initiative, motivational aids have helped to alleviate the situation. So far, the KM journey has paid off because the first results are being attained.

### I. Results

Top management knows that performance monitoring is essential to measure any initiative progress. KM is not the exception, and a set of key indicators both direct and indirect has been developed in the organization towards this end. For instance, there is a record of the number of videoconferences per month aimed at sharing knowledge between employees working in different locations.

Similarly, on a monthly basis, CED keeps track of the amount of meetings organized for transmitting knowledge from senior to junior employees, the number of technological diagnosis completed within the division's departments, the quantity of knowledge diffusion meetings, and the number of technical experiences registered on the intranet. In fact, the intranet interface is continuously improved by means of its internal counter, that shows what are the most visited links. This allows the division to put important information in key sites.

Overall, as a result of its execution, the KM initiative has enabled the division to improve its internal processes, enhance decision making, improve work efficiency and productivity, increase responsiveness to customers, and improve the work environment.

### III. CONCLUSIONS

The case study information shows that CED is a Mexican company that has started to implement KM, because its benefits are known in the organization. As a result, employees have been very enthusiastic not only during the implementation process but also in its operation stage. In this sense, human resources have been a critical factor to successfully put the initiative into place.

On the other hand, CED is normally involved in continuous improvement activities, and KM is an essential

element to enhance. Consequently, the division has had positive changes in terms of its internal decision making processes, work efficiency and productivity, responsiveness to customers and work environment. Overall, while KM is not fully mature within the company, its first advantages can already be observed.

### ACKNOWLEDGMENTS

The authors would like to thank COMECYT (The Council on Science and Technology of the State of Mexico), EMERALD Group Publishing Ltd (based in the United Kingdom), and the Mexican Science Academy (AMC) for the financial support given to carry out this work. Thanks also go to the Mexican company that took part in the case study.

### REFERENCES

- [1] Wong, K.Y. (2005), "A critical review of knowledge management frameworks", *International Journal of Information Technology and Management*, Vol.4 No.3, pp.269-289.
- [2] Wong, K.Y. and Aspinwall, E. (2005), "Knowledge management: case studies in SMEs and evaluation of an integrated approach", *Journal of Information & Knowledge Management*, Vol.4 No.2, pp.95-111.
- [3] O'Dell, C., Wiig, K. and Odem, P. (1999), "Benchmarking unveils emerging knowledge management strategies", *Benchmarking: An International Journal*, Vol.6 No.3, pp.202-211.
- [4] Davenport, T.H. and Volpel, S.C. (2001), "The rise of knowledge towards attention management", *Journal of Knowledge Management*, Vol.5 No.3, pp.212-221.
- [5] Pan, S.L. and Scarbrough, H. (1998), "A socio-technical view of knowledge-sharing at Buckman Laboratories", *Journal of Knowledge Management*, Vol.2 No.1, pp.55-66.
- [6] Martiny, M. (1998), "Knowledge management at HP consulting", *Organizational Dynamics*, Vol.27 No.2, pp.71-77.
- [7] Liebowitz, J. (2003), "A knowledge management implementation plan at a leading US technical government organization: a case study", *Knowledge and Process Management*, Vol.10 No.4, pp.254-259.
- [8] Wong, K.Y. (2008), "An exploratory study on knowledge management adoption in the Malaysian industry", *International Journal of Business Information Systems*, Vol.3 No.3, pp.272-283.