Abstract:

In today’s world people no longer need to be in the same building or even on the same continent to work together. With the assistance of Information Technology (IT), project teams can become more flexible, adaptive and competitive by improving their performances. This paper presents the implementation and usage of online collaboration and project management (OCPM) technology as an enterprise solution to enable and empower virtual teams as well as to manage information and knowledge within a construction organization to gain competitive advantage in global construction market. The paper builds on a case study about OCPM technology usage at Sonae Imobiliária (Sonae); a Portuguese real estate company based in Lisbon, which designs, builds and operates shopping malls. The main question the paper tries to answer is “How do you keep connected on a continuing basis when you are working with people that span the whole world?” In this case, OCPM technology gives the opportunity to form a collaboration platform for continuous and accurate communication, immediate access to the project information, and provides a central communication and project management interface where all information stored in a virtual project space. The goal is to have better communication, more comprehensible documentation and optimal control through fast and accurate information flow, secure document availability, and continuous reporting regardless of the location.

Keywords: Extranets, Globalization, Information Technology, Project Management, and Virtual Teams

INTRODUCTION

With the assistance of Information Technology (IT) groups of people can work independently for a shared purpose across space, time, and organizational boundaries. [Gibson, Cohen, 2003] Working with a wide diversity of knowledge and skills from all over the world brings a broad range of viewpoints and expertise to the projects. The growing prevalence of virtual teams is being attributed to a confluence of technological and organizational developments along with a range of business benefits associated with using these types of teams. [Solomon, 2001] Working as a virtual team reduces costs by
cutting travel expenses and creating new “e-economies” of scale. Furthermore, project time cycle can be reduced as the information flow becomes faster and continuous communication is established with accurate data. Online collaboration and project management technology (OCPM) becomes critical in virtual teams to improve the speed and the quality of the information flow, to facilitate virtual team work and also to detain the organizational knowledge.

However, despite all the benefits and opportunities that OCPM technology provides to virtual teams, it has been difficult to find examples, which implement OCPM technology as a sole source for working virtually. Therefore, to have a better understanding of how IT enables success in virtual teams and helps a company to capture and share company-wide knowledge, a case study has been studied as an empirical investigation of OCPM technology within its real life context. This research paper examines the opportunities and the challenges of working in a virtual space with the assistance of OCPM technology and how virtual teams can use this technology to empower their organizations in global competition.

OCPM TECHNOLOGY

In this paper, OCPM technology refers to any number of web-based (information generated by project team members is automatically saved to the OCPM on the web) and web-enabled (the Internet is used to connect directly to remote applications and self hosted client databases) technologies which offer communication platforms, project management functionalities and hosted collaboration spaces for capital construction projects. In both of these configurations, team members can reach the project information through their Internet browsers with permission-based access requiring user names and passwords. Although business models vary among OCPM technology providers, these services are typically leased for either a periodic and/or per-user fee.

OCPM technology is being used for facilitating team communication, managing and storing documents, controlling workflows and automating construction processes. These tools enable project participants to send, record, store, share, receive, monitor, and manage correspondence, Request for Information (RFI), drawings, specifications and other documents involved in the design and construction processes. [Becerik, 2004] Beyond basic capabilities such as document sharing and storing, there are many other features offered by the various vendors. These range from document routing and tracking, to visual project management tools to bidding and pricing systems, to accounting and more. These solutions can be utilized for team communication and document management, workflow and process automation, and process & project management.

VIRTUAL TEAMS

In traditional teams, members are all either located regionally, or involve international team members meeting at specific meeting dates. Although this gives the opportunity for strong interaction, it becomes inefficient and unrealistic due to time and money wasted in
travel and non-relevant meetings. In today’s world people no longer need to be in the same building or even on the same continent to work together. A recent survey by the Gartner group found that more than 60% of professional employees work in virtual teams. [Kanawattanachai, Yoo, 2002] Virtual teams provide an effective structural mechanism for handling the increased travel, time, coordination, and costs associated with bringing together geographically, temporally, and functionally dispersed employees to work on a common task. [Martins, Gilson, Maynard, 2004] Project teams can instead create the possibility of continuous interaction with more regular ‘virtual’ meetings than traditionally possible. In virtual teams, one need to have no designated workspace or had multiple workspaces. Time zones can be used as an advantage for shifting work when the project schedule became tighter.

Besides the advantages of working virtually, there are also bottlenecks such individualism, attachment to power, and desire to be involved in everything. One of the fundamental factors that are believed to be important in determining the success and failure of virtual teams is trust. Trust leads to more open communication, cooperation, higher quality decision-making, risk-taking and satisfaction in the decision-making process [McKnight, Chervany, 2000] Because virtual teams communicate less efficiently than face-to-face groups [Hightower, Sayeed, 1996], they tend to be more task-oriented and exchange less social–emotional information, slowing the development of relational links. [Chidambaram, 1996] In order to avoid problems and strengthen trust, roles and responsibilities among the team members should be defined very clearly. [Cannon-Bowers, Salas, Converse, 1993] In addition, the goals, the plan of the tasks, and the targeted result should be set from the beginning and should be updated as the project progresses so that each person knows exactly what his/her responsibilities are. Because the organizational culture influences the virtual work environment, and the virtual work environment affects the organizational culture. Working with a wide diversity of knowledge and skills from all over the world brings a broad range of viewpoints and expertise to the construction project. However, working with different cultures is one of the challenges the team has to face. The team members may observe a gap between the organization’s current culture and virtual culture due to the differences in the characteristics and backgrounds of the people in the core project team. [Hofstede, 1983] OCPM technology becomes very important in virtual teams to improve the speed and the quality of the information flow.

SONAE IMOBILIARIA

Sonae Imobiliária (Sonae), is a Portuguese real estate company based in Lisbon, designs-builds and operates shopping malls. Sonae actively participates in the development, investment, and management of its projects. By 2004 the company owned or co-owned 26 shopping malls and 2 retail parks in Europe and South America with a total gross leasable area (GLA) of more than 1.5 million m² with more than 5,000 tenants. (http://www.sonaecom/ Sonae’s development role does not end upon project completion, as the building is kept in its portfolio and managed by the company. This approach requires greater effort in ensuring project profitability and problem-free management in order to permanently increase the project’s market value and the
company’s value. It also encourages high quality design, low maintenance solutions, and professional management to avoid creating problems. Besides these challenges, the specific and complex nature of shopping malls requires working with multi-disciplinary design teams with complementary skills. [Quentela, 2002]

Sonae’s goal is to take a global perspective of the shopping and leisure business and to introduce new concepts through local partnerships based on a long-term view of investments. After several years of successful development projects in Portugal and Spain, Sonae began its international expansion in 1997, and took on the ambitious task of developing a new regional shopping mall in South America. The company was unable to relocate senior staff to manage the project due to obligations to several other projects and as they were entering numerous markets simultaneously. The main challenge Sonae faced was how to establish efficient decision-making processes for budget, schedule and design issues that would successfully integrate local conditions, codes, and construction into a well-differentiated design. The projects involved many participants from different countries with different backgrounds. Managing design and construction with a virtual team became the primary challenge. Therefore, in addition to tackling a new market in an area with cultural, social, and economic differences, Sonae decided to create an effective international organization virtually.

Usually, there are three types of architects working on Sonae’s projects. The lead architect follows through the entire project and carries overall responsibility and is responsible for developing an initial concept that works well commercially, financially and architecturally. Sonae chooses to outsource completion of the design work, which allows them to develop several shopping malls at the same time and focus on their core business. The collaboration starts with two to three day live kick-off meetings after the team has been established. The two external roles are the design architect and the local architect, which both work under the lead architect. The design architect takes the initial conceptual design and develops it further, suggesting design alternatives to pursue. After evaluations, one alternative is chosen and developed according to the feedback from other team participants. The local architect is chosen after the design development phase is over, and his responsibility is to develop construction documents according to the local conditions, materials and regulations. In addition, there are several consultants in every project. Also Sonae contracts lighting designer, graphic designer, landscape designer, engineers separately as well as on-site design and construction administration to local designers to complete the project team. Therefore, the use of OCPM became very critical to the process allowing geographically dispersed teams to collaborate smoothly with minimal investment in technology [Shim, Warkentin, Courtney, Power, Sharda, Carlson, 2002] in Sonae projects.

THE USE OF OCPM TECHNOLOGY IN SONAE

In order to enable continuous communication and collaboration among the team members, Sonae uses three main methods for communication in their projects: virtual asynchronous, virtual synchronous, and face-to-face. E-mail, telephone, fax, File Transfer Protocol (FTP) mobile telephone, and videoconferencing are all used for communication.
and reporting. The key characteristic of all of these methods is simplicity: they are inexpensive, readily available, and relatively easy to use. Using cutting-edge IT can actually create obstacles in the early stages of the process as most people might be unfamiliar with and reluctant to use new systems. Therefore, it was important to have an IT system capable of integrating people and documents together in a way that allows participants to quickly enter the virtual team without a complicated training process. After careful evaluations of different systems, the company decided to standardize a German OCPM solution called conject (www.conject.com) in all of their projects starting from 2002. This tool gives project teams the opportunity to form a collaboration platform and provides continuous and accurate communication, immediate access to the project information by a central communication and project management interface for projects where all information stored in a virtual project space. The goal is to have better communication, more comprehensible documentation and optimal control by having fast and accurate information flow, secure document availability, continuous reporting regardless of the location. This system allowed Sonae’s leading architect to head up this virtual global team and retain control of the entire project from his office in Portugal. As a result, Sonae had 17 major projects under development managed by Sonae’s enterprise OCPM solution in year 2004.

OCPM TECHNOLOGY AS A COMPANY SOLUTION MODEL

Sonae utilizes conject in all of their projects both for the design and construction phases. As of April 2004, Sonae had one project space for the Development Department, and seven active projects, which are in the planning and/or execution phases. Four of these projects were in Portugal, one is in Spain, one in Italy and one in Germany. Five languages (German, English, Spanish, Portuguese and Italian) support these projects. There are in average 40 to 80 people have access to each of these projects. The most used applications are document and communications management, plan management and the reporting engine.

All of the project participants have user names and passwords to log into the system. The access levels are preset by the administrator according to the groups established. There are five permission levels in conject for Sonae projects: owner, editing, downloading, read-only, and none. The owner of a document or directory has permission to edit, move or delete, and can assign permission for his document or directory. Editing gives the user the right to edit, version and load documents, send notifications, and make documents read-only to prevent simultaneous editing. Downloading permission grants the right to download documents, to view them and save them to a local system. Read-only permission just lets you read or print documents but not save them. The “redlining” of documents can also be viewed, along with the document history. Each project participant with viewing permission can assign viewing permission to all documents to other participants, unless the document is labeled “confidential”. None means that no permission is granted to view the documents.

1 conject Project Space, LoureShopping User’s Guide

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Conject provides better ways to facilitate communication and immediate access to the project information. For example, it gives every user a project mail directory that is project specific and personal, and shows document status to provide optimal support for the document approval process. Status is represented on the platform by traffic light symbols. The directory tree therefore shows you at a glance the status of each document.

There is one architect in Sonae’s Lisbon office for each country that is responsible for coordinating the information flow and communication. Although conject is not currently used for the facility management of Sonae’s shopping malls, the facility managers have access to the system. For example, if they want to locate ceiling utilities for maintenance, they know where to find the information in conject. Sonae also uses conject to facilitate communication with their shopping mall tenants, particularly with the large tenants who have been given full access to the system. Sonae has used their power as owner to mandate that the outside participants use conject. The lead architect, Jose Quintela indicates, “IT is driven by the owner as the owner has long-term interest. Owners impose the IT and they select the team. Once you have people to work with there is no reason for them not to use the system if you make them use it as an owner. Service is very important. If you don’t open the shopping mall on time, you are in trouble.”
DIFFERENT OCPM UTILIZATION APPROACHES

Sonae uses conjec in five different ways to accommodate the needs of the company. The first use is as a project space for *projects under development*. This project space is mostly used by the architects for studying design alternatives. The platform provides the latest versions of the information in a consistent directory structure to all Sonae employees that are involved in these projects. After a concept is developed, there is a project space for “conditional projects” which don’t yet have a license. In this phase, conjec is used for managing different participants such as planners, consultants and project managers that are already involved. Another project space is for “unconditional projects”, which are ready to go and have their own active sites in which all of the project participants have access to all project information.

When a project is completed all of the information regarding the project is archived in another virtual space, which serves as a database for all Sonae projects. This virtual archive facilitates learning from past experiences. A knowledge management center called “Forum” is used as a central “know-how pool” where everyone can have feedback discussions with the project leaders of the different projects to find out what can be improved by organizing projects via conjec. In this platform, there is a regular exchange of information regarding the current projects where lessons learned are shared, examples are set, and guidelines and checklists are provided. A knowledge manager is responsible for the supervision of the platform.
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Fig 3. Project space for under development projects

Fig 4. Individual project space
The final way that Sonae uses Conject is creating “Standard Project Spaces” as a basis for best practices. In this space, different project types (e.g. structured by conditional costs or project complexity) are defined, and a project space for each project type is created to provide detailed information. Standard Project Spaces consist of explanations for project core processes, templates (Memos, CAD-CAFM-Guidelines, Change Request Management, Accounting etc.), Directories, Permissions & Groups, Standard Workflows for processes, categories and views, master contracts (designers, general contractor), and examples for project plans, memos, name conventions for plans, decision templates, structure for jour fixes (weekly meetings, e.g. Planner Jour Fixe or Construction Jour Fixe). The Standard Project Spaces provide a consistent structure and defined templates and processes for the users.
Fig 6. Diagram of Standard Project Space (Courtesy of Maren Mueller, conject AG)

Fig 7. Sample Standard Project Space
CONCLUSION

Sonae managers indicate that the use of an OCPM technology is vital for the company’s success. OCPM technology gives the team an opportunity to form a collaboration platform for continuous and accurate communication, immediate access to the project information, and provides a central communication and project management interface with all information stored in a virtual project space. The goal is to have better communication, more comprehensible documentation and optimal control regardless of the location through fast and accurate information flow, secure document availability, and continuous reporting.

The technology makes all the information available to everyone at the same time, increases accessibility and improves the communication lines between the parties. Jose Quintela says, “If this technology didn’t exist, Sonae Imobiliária wouldn’t exist either, at least the way it exists right now.” He explains that they would be designing and building one shopping mall at a time like their competitors are doing, rather than being able to design and build several shopping malls by managing several different teams concurrently.

Although there is a need, and an associated cost to update the system often to keep up with the latest technological advances, the technology provides great opportunities that enhance designers’ abilities to work abroad such as the ability to share data in-between the physical meetings made Sonae’s projects possible. As Jose Quintela says, “It would be impossible to manage the quantity of people and the quality of design in the schedule the project had. The cost could be two or three times more, and the design schedule could have doubled and we wouldn’t have the control we had all along the process.” Another important aspect is the company-wide use of a communication platform, which enables the company’s global operational model. Sonae was a relatively small and unknown company in Europe before it started to implement OCPM technology. Today, Sonae owns 26 Shopping Malls and 2 Retail Parks in Portugal, Spain, Italy, Germany, Greece, and Brazil.

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REFERENCES


