



## Case Study in Project Management

### ERP at Kohinoor Planet Constructions: Dead End or A Road Ahead

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## Disclaimer

This case study is prepared and written by Dr. R. Raman, Dr. Dhanya Pramod, and Mr. S. Vijayakumar Bharathi, Symbiosis Centre for Information Technology (SCIT), Symbiosis International University (SIU) Pune, in consultation with Kohinoor Constructions Pvt. Ltd., Mumbai, as part of PMI India's sponsored research funding, February 2013.

The objective of the case study is not to illustrate whether managerial situations in this project were handled effectively or not. The case has been created to facilitate class-room discussion in project management for practicing project managers. The authors may have disguised certain names and other identifying information to protect confidentiality.

## Background

It was a pleasant Wednesday morning in December 2009 at the Kohinoor corporate office in Dadar, Mumbai, and the group's chairman and managing director (CMD) was looking at an accounts report in which something seemed amiss. He was perturbed by two different revenue figures for the same period for a project at Kohinoor Planet Construction Private Limited (KPCPL), a multi billion rupees Indian business conglomerate. There was discrepancy in the reports submitted by the accounts and sales departments. The CMD voiced his concern to the vice president, Kohinoor City Project, regarding the validity of reports submitted to his office.

This was the third time that the CMD had aired his frustration regarding the veracity of data in reports. The vice president realized that the root cause of these issues was the company's lack of an efficient enterprise level information system. The company needed a sound reporting structure enabled through an Enterprise Resource Planning (ERP) system that would facilitate informed decision-making for both strategic and operational requirements, and provide support to the groups' business growth initiatives.

In 2011, the group's Kohinoor Hospital was the first multi-specialty hospital in Asia to be a LEED platinum certified green building. The Kohinoor City Mall was also awarded the LEED gold rating. The Kohinoor Square, a twin towers project, is now in line for the certification. 'Going green' has been truly ingrained in the corporate philosophy. Overall, Kohinoor's growth and expansion through diversification has come as an outcome of trust, honesty, planning, and timely execution of the projects that are not only profitable but also socially relevant. Innovation in design and quality have been the hallmark of Kohinoor group's projects. The top management felt the need for an information system that can help manage the group's explosive growth plans in the real estate business. With this primary objective, the group envisaged an ERP project for KPCPL.

## Challenges

The company faced challenges in reporting, particularly from the sales and accounts departments due to different types of reports being generated for sales, revenue, accounts receivables, and status of project completion. Sales receipts did not match with records being maintained by the accounts department and that led to further problem such as the two receipts not matching with the bank's statement on realization of receipts.

The process involved was simple: when a project is completed, a notification is sent to the architect who issues a completion certificate. Based on this certificate, a demand letter is raised for processing the payment. Each portion or slab of every flat completion was worth INR 50-60 millions. The top management had difficulty in getting status updates on the completion of work, finance receipts and payments, and recovery of payments. In other words, the top management did not have an overall picture of project status similar to a dashboard. The top management felt the need for an integrated information environment from where reliable, accurate, and real-time information can be received that would do away with the problems of disintegrated information flow, heterogeneity, and deviations in reports from reporting departments.

## Vendor Selection Process

In February 2010, a committee was constituted of key members of the group chaired by the vice president, construction for the ERP project. Interestingly, no separate IT department was formed to implement ERP. Industry-specific ERP vendors [Table 1] were invited to present their solutions that were evaluated by the committee. Apart from cost, the other key factors for evaluation were usability, vendor service, ease of implementation, the features of the software, and the location of the vendor. A software named Real-Rise by Mitrox Infotech Pvt Ltd. was selected. Mitrox is an ERP product company based out of Pune that specializes in the construction sector. Real-Rise ERP was tailored to the needs of the construction industry also the company demonstrated strong domain knowledge in the construction industry and was capable of business process reengineering (BPR) and management consultancy for implementing ERP at KPCPL. Real-Rise contained various business modules like Accounts & Finance Management, Sales & Marketing Management, Project Estimation & Planning, Purchase & Inventory Control, Human Resource Management, Quality Control, Lease & Mall Management, and Tender Management, Civil Works [Exhibit 1]. The selection committee was also impressed with the client list of Mitrox that had several prominent industry players. However, the selection committee did not spend sufficient time on the project scope management. Project scope management is very critical for long-term, strategic initiatives like ERP implementation as it enables the development of the detailed scope of the project, deliverables acceptance process, and change request management. These areas became a challenge for KPCPL in the subsequent stages of the project.

## Project Implementation

The implementation started with two meetings between KPCPL and Mitrox during April 2010. The main purpose of the meeting was price negotiation and the implementation process itself. The chief of purchase and chief of accounts, along with the vice president, Kohinoor City Projects, represented KPCPL. After negotiation, it was decided that KPCPL will pay...

- An initial lumpsum amount to kickstart the project
- A milestone payment based on the completion of the pre-determined phases of the entire project
- Annual maintenance contract (AMC) based payment for Mitrox support after the completion of each implemented module
- Additional payments for customization, if any

In addition to the above clauses of the contract, the requirements of any upgrades or versions will be charged separately by Mitrox during implementation and during the AMC period. The planned implementation time was fixed at 12 months. Though there was price negotiation and the parties arrived at a consensus, they did not back it up with strong project cost and time management, keeping in mind the scope and nature of the project. Project cost management enables clarity of thought and action with regard to the cost of resources required for the project, which will in turn be useful for pricing. Activities like cost estimation, budget estimation, and cost control need to be done scientifically.

The hardware and network infrastructure requirements of the project were kept out of the contract, as KPCPL had planned to procure them. The solution planned to be deployed was a client-server based solution; a dedicated server would be placed at KPCPL in which all the modules would be loaded.

As planned, KPCPL procured the necessary IT infrastructure that included the hardware and networks, and implementation started on time. The civil contractors module was the first to be implemented, and problems started. Implementation had started without a well-defined and accepted scope management plan, and resources were accumulated for the project as and when it was needed. This led to a series of challenges.

There were doubts about the suitability of the ERP product to KPCPL'S business model. The civil and the accounts departments started asking for changes to suit their business process requirements, which Mitrox agreed to incorporate initially. However, scope management of the project suffered because of many more such change requests after implementation had started. The complexity of some of the change requests added to time delays. There was no single authority like a project manager from KPCPL to oversee the project. The vice president, Kohinoor City Projects, was in-charge but he depended on his secretary, accounts executives, and purchase executives for project updates. HR management was not conducted well. The vice president did not constitute a project team to assist him in planning and decision-making. Effective HR management involves the project sponsor and project management team in project funding, monitoring progress, and influencing the key stakeholders. As a result, in September 2010, five months after the project had commenced, the first month's milestones had not yet been accomplished. Planned and well-executed HR management would have infused the required confidence in the team to carry out different activities for the project. This would have led to close monitoring of the project scope. The cost of customization was skyrocketing and the CMD was highly disappointed with the project status.

The accounts department was not happy with Real-Rise and went back to the existing accounting software. "Our current accounting software fulfilled the requirements of our daily accounting routine and also complied with the reporting requirements of the organization and statutory obligations. I did not see any valid reason to shift to a new system and reinvent the wheel," said a young accounts manager.

There were problems due to deviation of information noticed between cheques raised and received that were not accepted by Real-Rise, causing delays in processing information. A sales manager said, "I thought the software was swift and flexible to accommodate changes such as customer name, apartment number chosen by the customer, and the addition of names during and after the apartment registration but the software could not cope up with our requirement and pace. It added to the problems of inaccuracy and delayed changes. These changes are critical and sensitive from our customer's viewpoint."

The accounts executive recalled, "I was checking the project's spends around five months after the project had begun and found that the total spend for the project was very high. We had spent more than 50 percent of the total project implementation cost and had not yet achieved the first project milestone."

The vice president, constructions, was highly disturbed, as the problems of mismatched reports continued and the ERP implementation cost along with the time delays were high. The relevance of cost management needs to be emphasized because project cost management involves certain critical activities like developing the likely costs of the overall project, determining and distributing the cost across project timelines, and controlling of the variances based on cost performance baselines. However, since cost planning was not structurally done, it had become difficult to control the actual spending. This resulted in lack of clarity on the cost performance of the project. All these made the vice president skeptical of whether ERP would solve the company's problems within the budget and the planned timeframe.

Though KPCPL was part of the construction industry, its business model was based on contract management , while the ERP product was primarily for a default construction business [Annexure I] that mapped end-to-end processes from procurement of raw materials to construction including running the bill of materials, MRP, inventory management etc. The contract management based model of KPCPL involved giving end-to-end contract to a third party vendor who took care of the material, sourcing of labor, and managing them for activities. KPCPL's role was to get legal clearances, the sale of constructed property, and accounts related to it. Unlike traditional construction business processes, KPCPL was not in the business of the procurement of raw materials such as cement, bricks, steel, and sand for construction or the procurement of interior materials such as tiles, paint, sanitary fittings, and piped gas lines. KPCPL was involved in raising bills for the work completed by the third party contractor that would be passed on to the accounts department for payment after verification.

With these mismatches going out of control, the vice president, constructions, called for an urgent meeting with the Mitrox implementation team. All the functional heads of KPCPL participated in the meeting, which included representatives from sales and marketing, accounting, civil contracting, and human resources. There were heated arguments between the two parties with one party blaming the other for the lapses.

The vice president wanted a commitment from Mitrox on the delivery of the final version of the product. He expressed concern over slow progress inspite of high spending. It is critical to note that the planning process group and the monitoring process group are the two significant activities that define project time management. This is because these two activities provide an end-to-end perspective of managing time throughout a project's lifecycle. Project time management includes "defining activities" in the work breakdown structure level to "logically sequencing" activities, "estimating the effort and resources," "development of schedules" for monitoring intermediate milestones, resource spending, and "controlling the schedule" to match the actual project progress with the planned progress.

The project team head from Mitrox wanted a commitment from KPCPL on putting an end to change requests. According to the project head, the product had changed so much since its original version that it seemed like Mitrox was creating a new product exclusively for KPCPL. Yet, the implication of change requests on project time and cost management was not taken seriously. It was taken for granted that changes could be made at any level by the stakeholders. This led to unprecedented delays in achieving the project milestones.

Mitrox also raised the issue of compatibility of the product after future upgrades due to further customizations. KPCPL said it informed Mitrox about its requirements before the project started. Mitrox said it was still ready to provide all the customizations but KPCPL must bear in mind that it would cause further project delays. When KPCPL asked for the revised costing and a stipulated project completion timeline from Mitrox, Mitrox asked KPCPL to specify all the requirements for all the modules so that there was no scope change as the project progressed.

However, there were further problems in accepting change requests. If a process owner at KPCPL wanted a report of the completion of slab II of a building, all details related to the construction such as consumption of all raw materials must be fed into the system. In the KPCPL's model of contract business, this was not possible. In other words, the data collection and reporting requirements of KPCPL did not match with the standardized traditional reporting features provided by Real-Rise. There was a mismatch in the change management process, which is one of the key ingredients of project scope management. Every change request must be captured and recorded promptly for timely incorporation. It is also important to note that scope changes could impact costs. Hence, it is critical to lay down formal change management procedures between the client and the implementer. However, there was no such procedures in place in this case to track and analyze the impact of change and cost.

A week after the meeting, KPCPL consolidated its requirements and sent it to Mitrox for their response. Mitrox took over a month to respond, during which time in October 2010, the project was put on hold. After continuous follow-ups, Mitrox came up with a revised cost and time structure that was almost 10 times more than the original cost. Due to the scope creep, the cost escalations seemed to be inevitable. This is due to the fact that the aggregated costs derived from the project calendar should have been matched with the planned costs in order to reconcile the deviations. Integration of scope, cost, and schedule measures enables earned value (EV) management for project performance measurement. However, in this project, we found that it was difficult to arrive at the EV because of the mismatch between time, cost, and scope. As a result, the project could not communicate the percentage of work completed and the value of completion by taking into consideration the cost performance baseline, total cost incurred, etc.

"We wanted an ERP to solve our integration and reporting issues. We did not want a white elephant that would aggravate our problems and heap more costs on us perpetually," said vice president, constructions. KPCPL could not foresee that the change in scope management would have such an impact on the project budget and would substantially delay the implementation process.

All the above factors show the relevance of ERP project scope management. ERP scope management depends on how well organizations map their business expectation with IT. Referring to Davenport's 1998 [ ] observation in the HBR article entitled, "Putting the Enterprise into the Enterprise System," it is critical to reconcile the technical needs with business needs. KPCPL, being in the construction business for more than a decade, had withstood the ups and downs of the industry and had gained a lot of experience in consolidating its business for future growth and expansion. KPCPL strongly felt the need for an integrated information system with a view to standardize and accelerate the flow of information in order to get updated information about the various stages of its construction projects. This expectation could have been met had the company clearly defined its scope of ERP adoption by taking into consideration the business objectives it wants to realize through the ERP system. However, the management was too eager to adopt ERP and did not spend much effort in studying its own requirements.

KPCPL started to feel there was a misfit between ERP and its requirements. "I think we were trying to fix a square peg in a round hole, and we had already felt it for quite some time now," said the vice president, constructions.

After tough reconciliation of expectations and deliverables of the project by Mitrox and KPCPL, it was found that only the sales and marketing department's requirements could be fulfilled with low impact on cost, time, and effort. Accordingly, the solution was implemented to meet the requirements of the sales and marketing function.

Eventually, sales and marketing started using the ERP system for billing purposes. "We have nothing to comment for or against the software because it just enabled us to execute the billing process in a way that we wanted. But we did not achieve the bigger onbjective of syncing it with other departments," said a sales manager.

All the other departments of KPCPL found Real-Rise unsuitable for their needs and hence, refrained from using it, thereby defeating the very basic purpose of ERP implementation. The accounts department lacked motivation to use the ERP; hence feeding of data into the system was a big challenge. The organization could not justify the efforts put for the ERP implementation. Real-Rise only partially fulfils the transaction process at KPCPL by processing sales data for completing contracts based on external data.

## Road Ahead

After the bad experiences with Real-Rise, KPCPL wanted to look for a better solution to solve its problems. The confidence was low in any off-the-shelf ERP solutions for the industry. The top management compared the current scenario with a situation that it had encountered in the education business vertical – Joshi Kohinoor Technical Institute (JKTI).

The management tried and tested an off-the-shelf ERP for JKTI. JKTI was unique from its industry counterparts with its pan-India presence that offered dozens of multi-disciplinary courses in vocational education. Admissions took place round the year and students graduated round the year. There were flexible payment options and several distinct business processes. The off-the-shelf ERP software failed and it had to be scrapped. Eventually, JKTI, with the help of a team of four members, developed an in-house software that met all its requirements, including integration of the functional areas such as finance, HR, student's life cycle, and other modules across the branches, and provided an integrated reporting module for the top management. It is functional even today and can be accessed at <http://jkti.kohinoor.ac.in>.

In January 2011, the CMD called for a high-level meeting to decide on the road ahead for ERP at KPCPL. The CMD was keen on developing an inhouse ERP for KPCPL instead of investing more into Real-Rise. The vice president, constructions, had his reservations as developing an ERP inhouse needed significant expertise, and companies develop homegrown ERP only as the last option.

He said, "It is not only about developing software but also about integrating it with other functional areas, implementing it, and constantly providing updates. In today's scenario, technology obsolescence is a reality and if we decide to go with a homegrown ERP, it should not be looked as a bespoke solution to our current problem."

The CMD expressed his interest in creating a separate organization under Kohinoor Group that will focus on software solutions development. It would enable the company to consolidate and commercialize its experiences in building and implementing information technology solutions to similar industry players.

As a first step, in February 2011, a separate information technology division was created and the IT support team of the Kohinoor Group was brought under the division. To kickstart ERP development for KPCPL, a general manager, a deputy general manager, and a team of three software engineers were recruited. A project manager was hired to look into the ERP project for KPCPL. The project manager roped in an existing deputy manager who had experience in handling the Real-Rise issue to ensure that the lessons learned from that implementation could be incorporated this time around. The deputy project manager completed PMI's Project Management Professional (PMP®) certification. The project manager decided to allow Real-Rise to be continued by the sales and marketing for which Mitrox would continue to provide support till the time inhouse ERP, E-Planet, gets fully functional.

The project manager believed that project management had a great role to play in the ERP project lifecycle for construction business [Annexure II]. He reviewed the role and critical activities of the project team and project methodologies to achieve an efficient ERP implementation. The question of cost overrun did not arise as in comparison



to an off-the-shelf product, the total cost of ownership for E-Planet was estimated to be at least 15-20 times less on an annual basis. All aspects related to planning, information system acquisition, personnel selection, and the management and monitoring of software implementation were diligently carried by the E-Planet project head. Scope, schedule, and change management documents were in place before the project kickstarted. It was also planned that the existing IT infrastructure would be put to the optimum use.

The project manager took the following decisions before developing and implementing E-Planet.

1. Emphasized on the creation of the project charter.
2. Set the timeline of March 2013 for project completion
3. Spent significant time in requirements gathering – considering the unique nature of the contract based business model of KPCPL
4. Real-Rise was based on VB & SQL client-server architecture and E-Planet would be developed as ASP & DotNet based application (web-based ERP solution)
5. The sales office was located in Kurla, Mumbai, while the accounts department was based out of Dadar, Mumbai. Due to high volume transactions between these two departments, it was decided to bypass the Internet cloud by connecting the offices through a leased line provided by Mahanagar Telephone Nigam Limited (MTNL)
6. To use the existing IT infrastructure in an effective manner, it was decided that E-Planet would be hosted on the existing server located at the Kurla office, which could be made live through a public IP. After the successful implementation, it was planned that the current server would be shifted to a hosted server environment
7. It was planned that the existing HR software and the accounting software, which were used across the Kohinoor Group, would be integrated with E-Planet
8. There was a concrete plan created for data migration for the sales and marketing modules which was still under Mitrox AMC. It was also decided that by late 2013, Mitrox would be discontinued fully
9. To equip E-Planet with extendable functionalities like analytics and business intelligence so as to enable seamless, robust and informed decision support to the top management

With the high expectations of the top management and the confidence and commitment of the project team, will E-Planet fulfil the cost, time, and scope requirements of all the functional departments?



# Annexure I

## ERP@Construction Demystified

This section of the case introduces readers to the impact of information technology in the construction business in India, giving readers a present and future perspective of the industry and its reliance on technology. Real estate companies that are in construction, project management, marketing, business management, or customer service have started to adopt information technology as a key differentiator for growth and change. We found that the critical challenges faced by the construction sector are:

- Capacity constraints
- The lack of trained manpower and managerial skills with performance much below international level
- A capital intensive industry with no sound financial management practices to measure performance
- Small and medium contractors with minimal resources to upgrade their capabilities
- Quality, safety, environment, and social aspects not being addressed appropriately
- Missing timelines in construction projects reducing business efficiency
- Lack of training and development mechanism for labor at different level to improve operational efficiency
- Existence of a skill gap due to an ageing workforce and changing skills requirements
- A fragmented system with limited adoption of information technology
- Lack of clearly defined processes and procedures for construction and its management

In short, prolonged or missed construction timelines, escalating project cost, shortage of skilled workforce, and the dynamism of buyers' needs and preferences have been some of the key challenges that the construction sector in India today faces. Interestingly, most of these challenges can be managed proactively and efficiently using information technology. On a positive note, the industry has started to realize that technology holds the key to not only address some of these issues but also respond to changing market conditions effectively.

The construction sector needs to rationalize and standardize a large chunk of its core processes to improve the quality, cost effectiveness, and timeliness of projects. Earlier researches have shown that the implementation of enterprise system in the real estate sector could reap significant benefits relating to reduction in time wastages in managing and coordinating the movement of materials for construction. Research has also shown that the implementation of advanced technology has enabled the sector to significantly reduce the time wasted in coordinating activities and in managing, moving, and installing materials for construction. From the commercial perspective, technology has enabled the sector to reduce the losses arising due to lack of interoperability, as well as transactional costs required to resolve disputes and claims associated with construction projects.

The adoption of technology in marketing and customer service functions of construction companies has been recognized as one of the key differentiators for success. In a highly competitive environment, deploying information technology for project marketing helps the business development team to design and deliver innovative and effective promotional programs. The traditional methods of marketing construction projects have proved to be extremely time-consuming and ineffective as they fail to provide potential customers useful information such as design and planning. In today's market, buyers have become discerning and are flooded with information that help them make informed decisions on housing investment. Here again information technology can be used to capture prospective customer data, study and analyze the pulse of the buyer, and create opportunities to differentiate a company's marketing efforts. A simple

example is that of websites created by construction companies that are technologically advanced, user-friendly, feature rich, and content rich that give prospects a real-life experience to reinforce buyer confidence. Over the past few years, construction companies have shown keen interest in promoting their projects through web portals, social media, online forums, and even mobile application. This means that the construction sector is determined to use technology not only to store data but even to tap, track, and store data for customer analysis to offer a better buyer experience.

Furthermore, technology enables the marketing team of construction companies to garner deeper insights into evolving buyer preferences and expectations, and position their projects to bridge the gap between buyer expectations and realization. In today's intensely competitive market, customer understanding is very critical to success, which is enabled by the prudent use of customer information through technology. However, construction companies are still not clear regarding the prevalence of barriers of technology adoption mainly from the cost and complexity of implementation perspective.

Among the several barriers to the overall deployment of advanced technologies in the customer service function, cost and complexity of implementation are of prime significance. Customer Relationship Management (CRM) has been seen as one of the most wanted application for many real estate companies due to the belief that the sales function can enrich creatively in identifying new buyers and sustaining the service levels for existing buyers. Real estate companies accept that their business model can be enhanced with more commercial value using CRM that will enable them to manage data from pre-sales, sales, and post-sales activities [ ].

The construction industry is no exception to the influence of ERP. Over the past five years, many ERP product vendors [Table 1] have sprung up to consolidate and capitalize on the need of information flow efficiency in this highly fragmented sector. Construction companies require an integrated flow of information for its core business processes. The development of an ERP product for a construction company has always been a challenge for product companies due to the lack of sufficient knowledge of the uniqueness of business processes in construction companies and the resultant requirements. Though certain functional modules like HR and finance may be common, there are unique requirements in the other functions. Some of the core modules (Figure 4) of a construction ERP would be Project Monitoring and Control, Sales Management, Tendering, Bill of Quantities, Purchase and Supplier Management, On-site Engineers Portal, Material Management, Labor and Contractors Management, Accounts Management, Accounting, and Human Resource Management. We found that some of the expectations of real estate companies from ERP products are:

- Reliable and detailed history of cost records and a comprehensive cost estimation feature
- Estimation through the use of central source lists relating to cost, time, and materials
- A comprehensive list to produce a proposal bid item list for inclusion in the bid documents
- Facility to issue prime contracts, subcontracts, purchase orders, potential change orders, and change orders, in order to release these items to accounting for review, approval, and use
- Real-time information on the subcontract and PO status, initial and revised totals, pending and approved changes, and amounts invoiced, retained and paid
- The capability to design customized reports and inquiries in addition to default pre-designed reporting features
- Readily configured master tables and items for infrastructure projects (such as fixed asset types for construction equipment)
- Integration to project management for the creation of projects based on receipt of tenders and creation of tender responses
- Creation of budgets based on detailed bill-of-quantities (an itemized cost document for tracking the consumption of materials, parts, and labor) based project estimation

A careful observation of the above points enable us to understand that most of the expectations of construction ERP relate to transparency, clarity, timeliness, and accuracy of cost information on their projects. Hence, an ERP system must be built around sound principles of project management. The construction sector works on project based business model. However, project management is very complex owing mainly to the long lifecycle of construction projects, multi-units involved in executing projects, and the unorganized nature of the sector. The main requirement of construction ERP is the ability to integrate project management, material management, and sales and marketing throughout the various phases of a construction project. To summarize, a construction ERP must be able to manage information flows through every phase of a program or project -- from planning and estimation, procurement, project execution, operations, and maintenance -- all supported by powerful dashboards and reporting capabilities [ ].

## Annexure II

### Project Management in ERP for construction industry

Project management has a great role to play in the ERP project lifecycle. Anees Ara, Abdullah (2011) suggests that by reviewing the role and critical activities of the project manager, project team, and project methodologies, a better ERP implementation can be achieved. It is in this respect that project management becomes crucial for success. Project management is a must to ensure that the implementation of ERP does not get into cost and schedule overruns. Project management deals with various aspects of the project, such as planning, organization, information system acquisition, personnel selection, and management and monitoring of software implementation. Application of the theory and method of project management lifecycle for ERP implementation will lead to timely completion and success of the project. Strategic project management will ensure that the needs are identified and serviced which will further ensure that the system deployed is aligned with overall business strategy [ ].

This case study explains the different phases of ERP namely project planning, product, vendor selection, and implementation, and narrates the inherent inefficiencies in project scoping, scheduling, and cost management. It also brings out the issues relating to configuration vs. customization resulting in a mismatch between client expectations and project deliverables. Finally, the case explains the abandonment of the ERP product and the company's recent initiative of starting the in-house ERP implementation from scratch. While preparing for the case, we came across a good saying, "Good, Cheap or Fast – select any two only." It reiterates that the relationship between the three major forces of the project, namely scope, cost, and time (schedule), form the core of this case too. These forces are so interwoven in any ERP project and it is quite challenging to strike a balance between clients' expectations and project deliverables. Say for instance, if you want an ERP to be running fast and cheap, then you will have to compromise on its scope and functionality. If you want your ERP to deliver all the expectations with quality and go live fast, you will have to compromise on cost. If you want your ERP to have a high quality and also be cheap, it will take time to achieve it [ ].

Saint-Leger and Savall argued that due to inadequate project management, strategic initiatives like ERP are short-lived due to the myopic nature of implementation in terms of effort and time. In other words, the absence of a long term-vision for ERP projects will take a substantial toll on the usage and percolation of ERP in organizations [ ]. Researchers in the past have also cautioned that the scope and complexities involved in an ERP project are different from other traditional projects. According to Davenport, ERP projects have a lot of managerial and organizational implications than just being technological. In such a case, it is critical to approach ERP implementation from an overall project management perspective encompassing all its knowledge areas [ ].

In the earlier paragraphs, we have brought out the need for ERP for the construction industry owing to the inherent challenges faced by the industry to strive, thrive, and drive the economic growth of the country. In order to manage the challenges more effectively, systems must be in place to support and strengthen the information flow across the core processes of the construction business. Project management can play a significant role in the following ways during ERP implementation for the construction industry.

- Successful completion within the budgeted time, scope, and cost of the project
- Effective use of the labor resource available
- Provision of timely information to all stakeholders of the project
- Plan and minimize the incidence and effect of risk in ERP project relating to the 5Ms, namely men, money, machines, materials, and methods

Standardization of routine activities and the optimum allocation of available resources for efficient and effective completion of the project are the fundamental purposes of project management. It is imperative that decision makers use appropriate measures of success and justify costs to success quantifiable upon using organizational resources. Though project management is not a very old discipline, over the past 50 years it has contributed richly in the form of frameworks, techniques, and tools for successful project completion.

The Project Management Institute (PMI) is a pioneering body worldwide for imparting project management professionalism. With its worldwide recognition and membership, PMI provides various services for the growth and development of the project management domain in the form of education, certification, and research. PMI has published project management standards of excellence in A Guide to Project Management Body of Knowledge (PMBOK® Guide). The PMBOK® Guide was first published in 1983 as a white paper to document the generally accepted project management principles and practices with the objective of standardization. Later after several refinement and testing initiatives in various industry domains, the first edition of PMBOK® Guide was published in 1996, which was followed by the second edition in the year 2000. In 2004 the PMBOK® Guide underwent a major revision. The fourth edition was released in December 2008. The work on the fifth edition is already in progress and is expected to be released in 2013 [ Exhibit 2 ] .

To reflect more comprehensively and accurately the expansive nature of project management, the PMI's library of global standards is grouped into three categories namely -- foundational standards, practice standards and frameworks, and standard extensions [ ]. The third category standard extension is an expansion over the foundational standards and provides standards and frameworks for industry specific projects. So far, there have been two such industry specific standard extensions, namely for the construction industry and the government. The industry specificity of construction projects enhances the relevance of project management in this case.

In this case, we have relied extensively upon the PMBOK® Guide Framework for the development process [ ] [Table 2]. Among the nine knowledge areas of the PMBOK® Guide, the scope of coverage for this case study is time, cost, and schedule (time).

# List of Exhibits

## Exhibit 1 Construction ERP Modules



## Exhibit 2

### PMI Global Standards



Source: Library of PMI Global Standards [ ]

<http://www.pmi.org/PMBOK-Guide-and-Standards/Standards-Library-of-PMI-Global-Standards.aspx>

**Table 1: A Sample List of Construction ERP Vendors in India**

ITAakash Strategic Software Pvt. Ltd.	Strategic ERP	Pranami Group, Kundan Spaces, Transcon Developers, Suvarnabumi Developers
Pinga Solution	PingaTM ePages	ABW Infrastructure Ltd., Green City BuildTech, Paramount Group, Mapsko Builders P Ltd, Dhingra Projects, Shanvi Estates, Nirali Group, Eros Group, DLF Land Ltd., Jaypee Greens Ltd., Majestic Properties, Park View Horizon
Mahalasa Infotec	RealSoft	NA
ABC Info Soft Pvt. Ltd.	Bhoomi	C&C Constructions Ltd, ABA Builders Ltd, Parkview Ltd, AMR Infrastructures Ltd, Ozone Proptex, Dwakadhish Buildwell

Quadra Software Solutions Pvt. Ltd.	Quadra ERP	Puravankara Projects Limited, VGN Group, Neptune Enterprises, Sobha Developers Ltd, Kumar Properties, Chordia Group, Akshaya Pvt Ltd.
Aspirtek Technology Pvt. Ltd.	OMNI	L & T ECC, Bombay Dyeing – Real Estate Division
URC Infotec	URCIMS	GMS Elegant Builders, Sigaram Constructions, URC Constructions, Hosur Engg Devt Constructions
Interactive Multimedia Technologies Pvt. Ltd.	eBuild	Amby Valley City, Shapoorji Pallonji P Ltd., Vatsalya Developers, HDIL, Hirani Group
BAAP Technology Corporation	Blue Dolphin	Sashta, Rishi Constructions, Nikita Constructions, Mahalaxmi Constructions, Dakshan Builder, W3 Constructions
ACG Infotech Ltd.	Construction ERP Solution	NA
Aurigo Software Technologies	Aurigo	Navin's Housing, Unity Infrastructure
HindSoft Technology Pvt. Ltd.	Construction and Builders Management Software	Nahr Realtors, Ravi Constructions, Ria Constructions Ltd, Kribhco Infrastructure Ltd.
Soft Tech Engineers Pvt. Ltd.	Opticon ERP	NA

**Table 2: PMBOK Framework**

Chapter	Knowledge Area	Description of Required Processes
4	Project integration management	Ensures that various elements of the project are properly coordinated
5	Project scope management	Includes all of the work required, and only the work required, to complete the project successfully
6	Project time management	Ensures timely completion of the project
7	Project cost management	Ensures that the project is completed within the approved budget
8	Project quality management	Ensures that the project will satisfy the needs for which it was undertaken
9	Project human resource management	Makes the most effective use of the people involved with the project
10	Project communications management	Ensures timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information
11	Project risk management	Is concerned with identifying, analyzing, and responding to project risk
12	Project procurement management	Involves acquiring goods and services from outside the performing organization



## References:

1. A Premium Coffee Table Book Celebrating 50 Golden Years of Kohinoor Group published by Bennett, Coleman & Company Limited, published by The Times Group, Maharashtra Times commemorating the 50 years completion of the Kohinoor Group 1961 - 2011
2. Davenport, T.H. (July/August 1998): "Putting the Enterprise into the Enterprise System," Harvard Business Review, vol.76, n.4: 121-133
3. Emerging Trends in Real Estate India 2012, Report published by Grant Thornton India LLP and Confederation of Indian Industry (CII) for the 8th International Conference on Real Estate at New Delhi, pp 42-47  
<http://www.grantthornton.in/html/publications/> (Accessed on 06 Dec 2012)
4. ERP for Construction Industry <http://www.eresourceerp.com/erpconstruction.htm> (Accessed 15 Dec 2012)
5. AneesAra,Abdullah S.Al-Mudimigh (2011),The Role and Impact of Project Management in ERP Project Implementation Lifecycle, Global Journal of Computer Science and Technology, Volume 11 Issue 5 Version 1.0
6. Project Management- Scope, Cost and Time, (2010) <http://www.articlesbase.com/management-articles/project-management-scope-cost-time-1852450.html> (Accessed on 11.12.2012)
7. Saint-Leger, G. and Savall, H. (2001), Post-ERP phase: feedback from experience regarding a project management change which did not occur, Conference de l'Association Information et Management, Nantes
8. Davenport, T.H. (2000), Mission Critical – Realizing the Promise of Enterprise Systems, Harvard Business School Press, Boston, MA
9. Library of Global PMI Standards, <http://www.pmi.org/PMBOK-Guide-and-Standards/Standards-Library-of-PMI-Global-Standards.aspx> (Accessed on 10.12.2012)
10. Fergal Carton, Frederic Adam, David Sammon, (2008), "Project management: a case study of a successful ERP implementation", International Journal of Managing Projects in Business, Vol. 1 Iss: 1 pp. 106 – 124
11. Library of PMI Global Standards, <http://www.pmi.org/PMBOK-Guide-and-Standards/Standards-Library-of-PMI-Global-Standards.aspx> (Accessed on January 24, 2013)