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"Erp and its Effective Application in Infrastructure Construction Industry"

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***Abstract*—** Enterprise resource planning (ERP) was initiated in the manufacturing industry. It provides a general working environment for an enterprise to incorporate its major business management functions with one single common database so that information can be shared and efficient communications can be achieved between management functions. Based on the requirements of running a construction scenario, ERP shows its potential for the infrastructure construction industry.

Enterprise Resource Planning (ERP) is now being greeted as a base for the integration of organization-wide information systems. ERP systems link with entire organization's procedure such as accounting, finance, human resources, store, quality control, manufacturing and distribution, etc. There are only some studies conducted about the effective implementation of ERP systems in the infrastructure construction industry, particularly for the construction contractors. The emphasis so far has been on client firms, engineering and design firms. Now the aim is to investigate the appropriateness and the effective application status of ERP systems in infrastructure contractor firms.

Keywords- *Enterprise Resource Planning, Infrastructure Construction Industry, Effective application, Optimization.*

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I. INTRODUCTION

Infrastructure Construction industry is a highly advanced industry. It needs to communicate on a large scale with other related businesses such as new construction material and advanced equipment suppliers, vendors, subcontractors and clients. ERP systems are being used by infrastructure construction companies to improve approachability in relation to customers, strengthen supply chain partnerships, augment organizational flexibility, increase decision making capabilities and reduce project completion time, reducing rework, reducing cumbersome inventory work and lower costs. These information systems are considered to integrate and partially mechanize many of the company's business processes such as human resources, financial management, inventory management, manufacturing, quality control work, procurement, construction, operations and maintenance. The main function of ERP is to provide one time entry of information at the point where it is created and to make it available to all the participants within the organization.

ERP systems are becoming a fact of business life, considering that even 'small' organizations are increasingly installing them. The adoption of such a system contributes to a more efficient operation of the company and to the removal of faults from multiple registrations, supporting all intra- and inter-business processes. The infrastructure construction industry has several unique needs that must be taken into consideration. There are very few studies conducted about the effective application of ERP systems in the infrastructure construction industry. The nature of the construction industry, combined with the lack of appropriate customized ERP systems suitable for the particularities of the industry, complicates the evaluation and selection processes of an adequate ERP system.

II. LITERATURE REVIEW

A. Connor and Dodd, 2000.

The following benefits could be gained by implementing the ERP systems in Infrastructure Construction Company:
1.Provide integrating operational surroundings.
2.Facilitate automation.
3.Availability of information from field level to the management level.
4.Integration in applications in any divisions.
5.Flexibility and facility to standardizing method or to accommodate alterations and globalization.
6.Achieve balanced people, process and technology changes through all areas.
7.Apply planning and program management practices during the program life cycle of a project.

ERP facilitates value creation by the following ways: integrating the actions of an organization; using 'best practices' inherent within the software; enabling organizational standardization; eliminating information asymmetries; providing on-line and real-time information; permitting simultaneous access to the same data for planning and control; and facilitating intra and inter-organization communication and association.

ERP, as a re-engineering process, can be implemented along a spectrum of approaches ranging from technology enabled approach to clean slate approach. Technology enabled re-engineering refers to using ERP to perform re-engineering before the business processes are re-engineered. Organizations should be willing to change business courses to fit the software with minimal customization.

B. Richard Werner's, 2004

Nowadays, an integrated approach to project management is critical to a contractor's success - yet, what works for one company may not work for another. Enter best practices and

benchmark metrics, which provide optimal procedures that are customized to fit each contractor. As illustrated in Richard Werner's article, "Using Benchmarks and Metrics to Become a Best in Class Contractor" (CFMA Building Profits, March/April 2004), best practices are essential for CFMs to evaluate the integrity, timeliness, and accuracy of the information they obtain.

By definition, a benchmark is a standard by which something can be measured or judged. For example, you might evaluate:
1) Whether your data is current.
2) The number of places where your data exists.
3) The number of pieces of information your employees have to re-key.

Relative to these benchmarks, there are three data-cantered benefits related with ERP solutions. This approach Eliminates data latency. ERPs update data everywhere simultaneously, so data latency (data that has been updated in one system but not yet in another) is impossible. It reduces data redundancy. A fully integrated system prevents data duplication in disparate systems. It decreases data entry duplication. Integrated systems use a single data source. Without a single data source, manual intervention is required to rectify failed authentications when synchronizing data.

C. Vinod Kumar Garg and N.K. Venkitakrishnan, 2005.

Enterprise resource planning software, or ERP, doesn't live up to its acronym. Forget about planning—it doesn't do much of that—and forget about resource, a throwaway term. But think of the enterprise part. This is ERP's true ambition. It attempts to integrate all departments and functions across a company onto a single computer system that can serve all those different departments' particular necessities.

That is a tall order, building a single software program that serves the needs of people in finance as well as it does the people in human resources and in the warehouse.

D. Graham R. Sturdy 2012.

The formal APICS definition of ERP is 'An accounting-oriented information system for identifying and planning the enterprise-wide resources required to take, make, ship, and account for customer orders. An ERP system differs from the typical MRPII system in technical requirements such as graphical user interface (GUI), relational database management system (RDBMS), use of fourth-generation language (4GL), and computer- aided software engineering (CASE) tools in development, client/server architecture, and open-system portability.'
Thus, ERP is a software infrastructure that helps to manage the diverse parts of a (global) organization. In brief, it is the planning of the 4 Ms: Man, Money, Materials and Manufacturing, and the aim are to increase the co-operation and interaction between all the departments such as the products planning, purchasing, manufacturing, sales, and customer's service department.

III. PROBLEM STATEMENT AND OBJECTIVE

Most organizations across the world have recognized that in a speedily changing environment, it is impossible to create and maintain a custom designed software package which will cater to all their requirements and also be completely up-to-date. Realizing the requirement of user organizations some of the leading software companies have designed Enterprise Resource Planning software which will offer an integrated software solution to all the functions of an organization.

A. Objectives

- Adoption of an ERP system is the single technological platform, which allows the homogenization of information and consequently leads to increased efficiency of construction industry.
- Specifically, the objectives and critical success factors of the ERP implementation will determine, and a preparation analysis regarding the operations and processes of the company before the introduction of an ERP will presented. Prerequisites, actions and expected results will be the outputs of this analysis. Furthermore, the necessary steps for the selection of an ERP system will analyze.
- Evaluate and decide the additions that need to be made to the business in view of ERP implementation. The aim is to make sure that there is not even a thin line of difference between ERP and the organizations commercial activities. It will be oriented to ERP function so that the benefit of ERP is received in full.

B. Methodology

- The methodology adopting is a mix of literature survey.
- By taking market studies from different types of construction companies.
- By discussing with various construction company's management and users of ERP system and taking detailed questionnaire survey.
- Making a note of the existing business system and list out the flaws and positive aspects.

IV. DATA COLLECTION AND ANALYSIS

The interview of three construction companies conducted where they implementing the ERP systems are made for analysis and discuss in terms of these key factors for successful ERP implementation.

TABLE I. BENEFITS OF ERP SYSTEMS

Firm	Needs & Problems	Benefits Observed
1) BGS CTPL	-Integration of whole process chain -Sharing of information in real time -Integrating multiple and remotely located site. -Decision making on budgeting and the actual costs during execution of projects.	-Automated documentation -Cost savings -Business Process efficiency -Automated generation of reports to assist in decision making. -Streamlining of operation and manpower.
2)IRB Infrastructure Dev.Ltd.	-Poor Coordination between head office & project site -Excessive documentation. -Delay in assessing quantum of spares. -Increase in procurement cost	-Sharing of information resources in real time. -Automated generation of reports to assist in decision making. -Reduction of paperwork, data duplication, human errors in data entry and

Firm	Needs & Problems	Benefits Observed
	-Less efficient scheduling and planning.	work redundancies.
3)RMC India Pvt. Ltd.	-Integration of whole process chain -Extensive database serving as an archive. -To improve customer satisfaction	-Improved responsiveness, customer service. -Ability to make better projection using historical data. -Increase productivity and efficiency.

The domestic infrastructure industry is experiencing an unprecedented boom. This is only going to accelerate in the coming years, as the government continues to invest heavily in building world-class infrastructure to attract global investors. However, the key to success in this environment is going to be efficiency, both in terms of operations and service delivery. ERP is an extremely effective tool that can facilitate both of these and support the quantum growth of the organization. From the above cited cases what we learnt is organizations which have implemented ERP are gaining high benefits in terms of cost reduction, effective communication, integrated functions, and higher profitability. This proves our proposition that ERP implementation reaps high gains in time, cost and performance.

TABLE II. STRATEGIC BENEFITS TO ORGANIZATION

Firm	Needs & Problems	Benefits Observed
1)BGS CTPL	Total Re engineering	Competitive advantages due to pioneering efforts in implementation of system.
2)IRB Infrastructure Dev.Ltd.	Technology enabled Re engineering	Advantages of gaining appropriate procurement process & keeping a complete track on the execution of project with the help of accurate planning.
3)RMC India Pvt. Ltd.	Realization of firm's values of being	Retain or attract new customers who are impressed with the system. Pioneering efforts in its field received tangible benefits such as gaining a reputation for being a technologically advanced firm.

V. CONCLUSION

This study found that the main benefits of ERP to infrastructure construction enterprises are integration of business processes, automated generation of reports to assist in decision making, and achievement of competitive advantage.

This is important to construction enterprises, because the infrastructure construction industry is known to be advanced and having competitive advantage helps these firms to award more projects. The problems faced by construction enterprises in implementing ERP include insufficient awareness of employees and short software testing period. It is recommended that firms do not rush into implementing ERP, and be mindful that it may be easier to change the software than change the human being, software should design and modify according to the requirements of the infrastructure construction firm.

REFERENCES

[1] Vinod Kumar Garg and N.K. Venkitakrishnan, ―Enterprise Resource Planning-Concepts and Practice‖, Second Edition, Prentice - Hall of India Pvt. Ltd., New Delhi, April 2005.

[2] Connor, J., and Dodd, S.C. (2000). "Achieving integration on capital Projects with enterprise Resource Planning Systems" Automation in Construction.

[3] Barthorpe, S, Chien, H J and Shih, J K C (2004) A survey of the potential for enterprise resource planning (ERP) in improving the effectiveness of construction management in the UK construction industry. International Journal of computer applications in technology

[4] Graham R. Sturdy, 2012, "Customer relationship management using business intelegent".

[5] Alexis Leon, ―ERP Demystified‖, First Edition, Tata McGraw - Hill, New Delhi, 2000.

[6] Shi ,J J and Halpin, D W (2003) Enterprise Resource Planning for Construction Business Management. Journal of Construction Engineering and Management.

[7] Voordijk, H, Leuven, A V and Laan, A (2003) Enterprise resource planning in a large construction firm: implementation analysis. Construction Management and Economic

[8] Jonathan Shi, Illinois Institute of Technology. Daniel Halpin, Purdue University, "Construction Enterprise Resource Planning (Construct-ERP)".