Management information system in construction project Using MSP

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Abstract: The Indian construction industry is known to be inefficient and highly resistant to change. Even with a changing market and increasing competition, there are no obvious signs of commensurate changes in methods and approach. Project management, on the other hand, seems to offer what is needed in terms of tools and techniques to raise industry standards. Currently of the project management based systems are being implemented by using web based Information system. This paper represents the efforts made on project management by Internet. Information technology is routinely used in construction industry as tool to reduce efforts, solve problem with improved coordination. Microsoft projects (MSP) software are used here for construction project management Information system.

Keywords: project management Information system, Information technology, construction management, MSP, Construction industry.

1.1 GENERAL

Construction works are carried out in the form of project. Projects are becoming progressively larger and more complex in terms of physical size and cost. In the modern world, the execution of a project requires the management of scarce resources; manpower, material, money, and machines to be managed throughout the life of the project – from conception to completion. Most of the time the Construction Industry has been criticized for its under-performance due to lack of performance measurements, project monitoring productivity, cost effectiveness, safety and sustainability. The construction industry business process is project based with multiple parties involved, including owners, general contractors, architects, engineers, sub-contractors and material suppliers.

It needs to communicate on a large scale with these parties. In contrast to other industries this industry it is not exposed to new technologies and methods every day exception to some new materials. This has resulted in the state that, existing technologies and methods have percolated to the root level and the industry does not find the need of high end professionals for day to day activities. The construction industry is characterized by many players of multiple disciplines who are brought together at various stages throughout a single project. The result is a reliance on a large body of information produced by many sources at many levels of abstraction and detail, which contributes to the fragmentation of the industry. This fragmentation, in turn, contributes to the poor record of overall productivity improvement in the industry. The construction industry has been faced with the problems of meeting project schedule, budget, safety, quality and...
specifications set by the owner and architect/engineer. The proper utilization of internal and external resources is essential if construction companies are to make the best business decisions, maximize business goals and survive in the competitive environment. Although the construction industry is one of the most highly fragmented, inefficient, and geographically dispersed industries.

ERP system could be used in the construction industry for the following purposes:

1. To improve responsiveness in relation to customers;
2. To strengthen supply chain partnerships;
3. To enhance organizational flexibility;
4. To improve decision making capabilities;
5. To reduce project completion time and cost.

These information systems are designed to integrate and partially automate many of the company’s business processes such as human resources, financial management, manufacturing, procurement, construction, operation and maintenance. It has been found from the literature review that out of the total cost, system-based costs including software cost, averages 40% of the total cost, the remaining 60% of the cost goes to training and professional services. ERP software cost averaged a mere 15% of the total cost of the system implementation.

1.2 INDIAN CONSTRUCTION INDUSTRY

The construction industry was accorded Industrial Concern Status under the Industrial Development Bank of India (IDBI). Now, the construction industry is the second largest industry, next to agriculture. With increasing thrust on developing infrastructure and attractive concessions appeasing private partnership in infrastructure projects, the Indian construction is already booming and is poised to see a bigger growth in future.

Construction is an integral part of infrastructure such as houses, offices, townships, urban infrastructure, highways, ports, railways, airports, power, irrigation, industrial project & so on. The importance of construction can be gauged from the simple fact that cost of construction of certain infrastructure projects may be as high 60 percent to 80 percent of the project cost. Construction is recognized as the basic input for socio-economic development. It generates substantial employment.

2. LITERATURE REVIEW

2.1 INTRODUCTION

Project management attempts to achieve project mission objectives within specified constraints. It needs information to make decisions. Information plays an important role in binding the building blocks of modern multidivisions, multiplication and multinational organizations.

The literature survey carried out is divided into a number of sections.
1) The basic concepts of management information system
2) Management Information System Framework
3) Specification For Developing Information system
4) System Acquisition
5) Problems in Information System Management.

2.2 MANAGEMENTS INFORMATION SYSTEM CONCEPT

In the following paragraph, MIS functions, its components, the structure of MIS, ways to improve management information system in an organization are discussed.

2.2.1 MIS FUNCTIONS

Project Management Information System is an integrated user-machine system that provides information to support operations, management and decision making functions relating to planning and control of project objectives by using software. It main functions are To set standards against which to measure and compare progress and costs. These standards include project time schedules, project control budgets, material schedules, labor schedules, productivity standards, and quality control specification and construction drawings by using MSP.

1. To organize efficient means of measuring, collecting, verifying and quantifying data reflecting performance with respect to time, cost, resources and quality.

2. To manage means of converting data from operations into information.

3. To report the correct and necessary information in a form, which can best be interpreted by management, and at a level of detail, most appropriate for the individual managers or supervisors who will be using it.

4. To provide management ‘exception reports’ to highlight critical factors.

2.2.2 MIS COMPONENTS

Project Management Information System comprises hardware, software, database, procedures, operators and documents.

**Hardware** The term hardware covers all the electronic and electro- mechanical equipment used in computerized data processing systems. This equipment consists of the Central Processing Unit (CPU) and its peripherals. Peripherals are the externally connected devices of the computer such as input devices, storage disks and output devices.

2.3 MIS FRAMEWORK

The information system supporting project management can be broadly categorized into five subsystems. These are

- Data processing system for operation and managerial levels.
- Decision support for managerial and top level
- Office information system for office and general purpose applications
• Artificial intelligence based systems for top level
• Communication system for co-ordination at all levels.

2.4.1 Recognition of Need/ Requirement Analysis

Understand the problem before solving it
Change in already existing system
This leads to initial preliminary investigation.
System Analysis produces statement of objectives of the candidate system
Not all proposed systems are desirable and sent for review.

2.4.2 Feasibility study

It is the outcome of the preliminary investigation and in this phase it is determined that the system is feasible or not System Analysis and his team members with the help of the user carry out feasibility study. The outcome of feasibility study is a formal proposal detailing the nature and scope of the proposed system containing the statement, problem, summary of findings and recommendations.

After the management reviews the proposal, it becomes a formal agreement, which then proceeds to the next step of Software design life cycle.

There are three aspects of Feasibility Study:

2.4.3 Analysis

It is the detailed understanding of all-important aspects of the system and their relationship within and outside the system.
Scope of proposed system is decided using data gathering tools such as interviews, onsite Observations, Questionnaire, etc.
The next step is to decide how to solve the problem.
Till this stage logical design of stem finishes and system enters the physical design stage.

2.4.4 Design

This phase produces the details of how a system will meet the requirements.
Design stage describes the data to be accepted, calculated, data storage method, table design with validation and security processes.
Data designers are responsible for providing programmers with complete and clearly stated System Requirement Specifications (SRS).
Reports formats are decided at this stage with the interaction with the user.

2.4.5 Implementations

During this phase the system actually take physical shape. Implementation stage consists of writing programs, testing and documenting programs, conversion of old data to new system, training the users, installation of hard ware and software if necessary and documenting entire system.
Evaluation of system as whether system fulfills original needs is also done.

2.4.6 Post-Implementation and Maintenance

Like any system there is an aging process that requires periodic maintenance of Hardware and Software.

During maintenance, programmers may find some exceptional conditions which have to be rectified or modified.

Developing system that requires as less maintenance as possible should be the primary goal of the System Development.

2.5 SYSTEM ANALYST

System Analyst designs Information System, which meet the organizational objective, promote integration of activities, and facilitate control and which are flexible and robust.

System Analysts job consists of:

- Gathering facts about the existing system
- Analyzing the basic methods and procedures of current information system
- Determining information needs
- Modifying, redesigning and integrating the existing procedures in the new system specifications to provide the needed information.
- System Analysis determines the design of the overall system

Obtains the necessary technical help from programmers, from specialists and equipment engineers.

System Analysis follows the system through design, implementation, follow-up and re-evaluation of a project that is always changing. Construction industry sources suggest that 85% of the project managers' time is spent on communication and 70% of project documentation is paper based. So there comes need of ERP (enterprise resource planning) and Microsoft Project to overcome the failure due to lack of management. ERP, Microsoft Project set at the disposal of medium and large companies, all the necessary instruments that allow businesses to reach a new management level. Microsoft Project ERP is a global management solution through which any company will be able to have the benefit of all the potentialities of an ERP used by thousands of companies and the experience of a team of experts. Project-oriented companies that want a total picture of their business are choosing to integrate their forward-looking, project management information with up-to-date financial details from their enterprise resource planning (ERP) system. Responding to this need for improved integration of the operational and financial aspects of businesses, it is necessary to provide business process integration between project management and ERP systems. The new integration solution will provide valuable insight into a company’s forecasted cash and resource requirements, as well accurate performance information, for effective decision making. The
resulting integration will provide these customers with a cost effective way to complement the strengths of ERP with best of breed project management from Microsoft Project.

In an increasingly demanding and changing market, to conquer and keep a leadership positioning represents a challenge only at the reach of companies that are able to follow the natural evolution of the business world and adopt innovation as their banner. The actual patterns of competitiveness, linked to the constant need for high financial performances, impose the adoption of new business models based on advanced technologies that will allow superior levels of productivity. It is not enough for the operational and transactional processes of business activities to function perfectly, it is necessary the existence of proactive mechanisms of decision support that allow the business to be stretched far beyond the physical borders of the company. A product with a high level of extensibility and a great adequacy capacity that sets at disposal of any company all the mechanisms that allow its adjustment to any business. It is required to connect Microsoft project management and SAP(R) solutions for customers. The resulting integration will provide these customers with a cost-effective way to complement the strengths of SAP with best-of-breed project management from Microsoft Project. With integration of ERP to Microsoft Project, companies will be able to tie project events to supporting business processes, such as procurement, materials management and service requests, to improve relationships with customers and achieve the fastest time to market. For example, when key project milestones are achieved, the ERP software can trigger the creation of purchase orders in ERP for integrated materials management. Companies that are proactively managing costs, resources and schedules no longer need to struggle to make their project management and ERP systems successfully interact.

To study - ERP (SAP-systematic application product)), various implementation phases, benefits of using ERP in construction industry, problems associated with material management in construction industry, material management modules of ERP

1) To study-Microsoft Project, various features of Microsoft Project, benefits of using Microsoft Project

2) Studying Microsoft Project and its various features, which will help to note the progress of project at any particular phase of project.

4) Working on ERP-material management module developed for small project, to tackle problem related to material management for same small project.

5) Applying Microsoft Project features for the same above small project.

6) To conclude from above work, benefits of integration of ERP and Microsoft Project and then recommend for the same. It is clear that a great deal of inefficiency exist in the mainly paper
based process deployed predominantly in the construction industry, centralized digital information management is used to support project management and distribution of project information and to promote co-operation in building process. Need of Integration - Many organizations utilize Microsoft Project management software for scheduling purposes and ERP for cost management and material management. This creates a significant need to integrate the data between these two systems so the project stays synchronized. The systems need to be integrated so that project-related data can be synchronized between the systems and to eliminate the costly and time-consuming data entry required keeping both systems consistent. Key ERP information, such as resource and material availability, needs to be provided to project managers working in Microsoft Project to improve their effectiveness during project planning, scheduling, and execution activities. Scheduling, resources, material management and time information need to flow between the two systems to ensure that the project can be completed as planned.

Since the materials management system described earlier involves several departments of the company, the co-ordination and communication becomes critical to the smoothness of the whole workflow. Unfortunately, all project managers agree that such co-ordination is difficult to achieve, and mis-communications often occur. Compounded by the variation orders initiated by the developers and the technical deficiencies of the suppliers problems and mistakes are often found in the process. According to the project managers, typical problems that occurred in the materials management processes are summarized below.

(1) Materials ordering - Abortive materials resulted from late notification of variations, Poor estimation of wastage level, Difficulty in tracing the outstanding amount of material.

(2) Delivery and distribution - Premature delivery causes damage of materials Late delivery results in progress delay, Insufficient storage space for materials delivered to site, Insufficient delivery lead time allowed, Delivery timing and quantity does not match with progress, Poor control of stockpile results in damaged, Poor control of materials check out, Lack of appropriate materials handling equipment.

(3) Payment - Payment date to suppliers not controlled by quantity surveyors, Inaccurate estimation of materials on site, Unit rates of variation items not agreed with suppliers. The main reason for most of the problems quoted by the project managers is the lack of integration and sharing of materials information across various functional departments. For example, if
progress review and reporting can be integrated into the materials ordering system, the chance of inappropriate delivery time can be avoided. Similarly, surplus materials can be reduced if there is continuous reconciliation of stockpile against work done and outstanding work. As commented by some project managers, monetary loss from damages, surplus materials and the like is almost unavoidable despite close monitoring of the project (under the current system). Therefore, allowance is made in the pricing of work items during the tender stage to cover the potential loss. If the materials management system can keep the damages and wastage of materials to the minimum, savings can be transferred to the developers. **Module of ERP**

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**FEATURES OF MICROSOFT PROJECT -**

1) Centralized Project Repository
2) Enterprise Project Structure & Codes
3) Cross-project Analysis and Reporting
4) 100% Web-based
5) CPM Scheduling :
6) Float Path Analysis :
7) Cross-Project Dependencies
8) Projects Reports
9) Resource Assignments
10) ERP or Accounting Integration :
11) Resource Leveling :
12) Baseline Management-based

**3.1 COMPANIES SURVEY:**

Microsoft projects is a readymade ERP Software which are widely used by the construction companies. Companies targeted are –

- **used by -**
  1) Goel Ganga Group, Pune.
  2) Paricharak Pvt Ltd, Pune.
  4) Amit Enterprises Pune.
  5) Rohan Construction Group, Pune
  6) DSK Construction Pvt Ltd, Pune.
  7) Kumar Properties
8) Puranic Developers Pune

9) Vedant Construction Pvt Ltd, Pune.

While some of the companies are using tailor made ERP which is customized by the respective companies to suite their requirements. Following are some of the companies selected for the survey

As per market survey which I conduct in pane& some part of Mumbai & due to the time limit I found following things which I mention with the help of graph

![Graph]

Fig.-3.2 Market survey analysis for software use

So as per survey which I conduct with various construction company, I am focus on” Microsoft projects (MSP)” Software only.

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