

Analyze and Study of ERP Systems used in Pune Region

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Abstract: The availability of various control techniques many construction projects still do not achieve their cost and time objectives. Research in this area so far has mainly been devoted to analyzing and study entrepreneur resource planning systems. There is limited research geared at studying factors inhibiting the ability of practitioners to effectively control their projects. To fill this gap, a survey was conducted on 30 construction project organizations in the pune, which was followed by interviews with site engineers and project managers. The main data which was collected is the estimated and actual cost and time of construction project and the ERP system used by that construction project. it is possible to study all the traditional systems of cost and time in construction project and to discuss about a new direction in the development of the construction pricing and the development of cost and time management and engineering system in construction (cost and time engineering in construction) integrating the assessment of investment costs, estimated pricing, estimated project scheduling, contract pricing, evaluation of the actual construction costs, and enabling to connect and manage the previous cost and time engineering processes. At the same time the concept of cost and time engineering systems in construction fixes the engineering, technical and technological basis of all processes directly or indirectly related to the definition of construction costs and to interpret the effects of cost and time engineering systems on construction projects. The common factors that inhibit both time and cost control during construction projects were firstly identified. the top five leading inhibiting factors - design changes, risks/uncertainties, inaccurate evaluation of project time/duration, complexities and non-performance of subcontractors were recommended. These mitigating measures were classified as: preventive, predictive, corrective and organizational measures. They can be used as a checklist of good practice and help project managers to improve the effectiveness of control of their projects.

Keywords: ERP, management, practice, project.

1. Introduction

In the construction industry, the aim of project control is to ensure the projects finish on time, within budget and achieving other project objectives. It is a complex task undertaken by project managers in practice, which involves constantly measuring progress; evaluating plans; and taking corrective actions when required (Kerzner, 2003). During the last few decades, numerous project control methods, such as Gantt Bar Chart, Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM), have been developed (Nicholas

2001, Lester 2000).

The modern system of construction pricing includes not only the budget development at the design stage but also determination of the construction products cost at other stages of the investment and construction process. The current pricing system in construction no longer meets the needs of the participants of investment and construction (primarily the needs of the state as the main participant in the efficient budget investment). Fundamental changes in approaches to the whole system of formation and management of construction costs are necessary

In this regard, the improvement of the construction pricing should be implemented through the transition to a new system of construction cost and time management that would combine the preliminary assessment of the investment costs, the estimated pricing, contract pricing, the system of the actual costs determination, and allow to connect and manage the aforementioned processes.

Construction cost and time management provides for interconnection of the investment and construction process stages, and transitions from one kind of cost to the other – from investment to estimated, from estimated to contract, from contract to actual, from actual to operation cost (with regard to reconstruction, capital and current repairs) and the investment cost of such facilities planned for implementation in the future.

Entrepreneur resource planning involves the engineering approach to pricing in construction, therefore the regulatory framework consists of the rules of town planning, civil and investment legislation, provisions of the technical regulations, etc. At the same time the listed legal acts regulate only some issues addressed by cost engineers. There is no systematic specialized regulation in this sphere. The authors believe that the conceptual model of such system should include the following:

- national regulation (laws, regulations, national supervision);
- self-regulation – standardization, professional certification (standards, rules, procedures, admissions, responsibility, control);
- territorial regulation of cost engineering in construction system development and management in Russian regions taking into account regional peculiarities (sets of rules, orders, control, supervision);

- corporate regulation – development and implementation of cost management systems in construction in government and other corporations (corporate standards, local regulations, relevant departments, internal control).

The need to develop efficient and manageable cost engineering systems is now recognized by many major players in investment and construction business – state, regions of the Russian Federation, state corporations and other companies follow.

2. Literature review

Title: Concept of Value Engineering in Construction Industry, Authors: Khaled Ali Alabd Ahmed, R. K. Pandey.

Abstract: Nowadays, Value engineering (V.E.) is considered as a tool of construction management that can help companies to improve their procedures, services and final products regarding the client's needs, as an end user, with respect to time, cost and quality. The V.E. process has evolved from previous methods based on the concept of value and functional approach. These methods were pioneered by Lawrence D. Miles, in the 1940's and 50's, who developed the technique of Value Analysis (V.A.) as a method to improve value in existing products. The concept of V.E. / Value Engineering (V.E.) has been developed through the years and numerous standards and manuals have been created. The wider construction market (U.S.A., U.K., etc.) has identified V.E. value and has used the practice extensively. The present study aims to clarify the concept of value management in construction industry, via literature review, and references and books the use of V.E. in global level and to present a short description of the worldwide know-how. That will be achieved by a historical review of V.E. and by the illustration of the most common definitions and a thorough terminology review. In addition, we will present three different markets applying V.E. worldwide, the U.S.A., the E.U. and the Japan Standards for V.E.

Title: Study on Value Engineering in Construction Projects, Authors: Abraham Lintu Varghese, Abhijit. N. Bhirud

Abstract: Value engineering is a technique by which we get to know how the cost of the project can be optimized without affecting the quality, requirements, function of the particular project. This paper tells us about the various factors which affect value engineering technique, the problem areas in the construction of buildings and also about the importance of application of value engineering to construction projects. Value engineering is a proven technique and the need of the current era.

Title: Application of Value Engineering in Construction Projects, Authors: Senay Atabay and Niyazi Galipogullari

Abstract: The current economic conditions have entailed the use of rational method and techniques and research and application of new techniques by utilizing advancements in technology in the field of production as well as in every field. Excess cost control requires to be maintained throughout the project life of building beginning from the initial stages of

design. Scrutinizing the project well and considering all possible alternatives particularly in design stage are important for achieving optimum cost. In this study, how the principles of VE (value engineering) are applied in construction projects is explained, and by covering Bregana-Zagreb-Dubrovnik Motorway construction in Croatia by BECHTEL – ENKA joint venture as the sample project, practices of VE in this project are described. The satisfactory results of time and cost saving are achieved by applying value engineering principles through the VE team during the project preparation phase and project revision phase. Approximately 43,000,000\$ and 12 months of time were saved in total thanks to all these VE works. This saving provided builder company with 6% financial saving and 17% work time reduction.

Title: Evaluation of Construction Projects in Terms of Cost, Schedule and Safety Performances, Authors: Patel Dilip Kumar A196 and K N Jha197

Abstract: Controlling is an important phase in any project. Earned Value Method (EVM) is one of the popular methods used in controlling a construction project. Safety management is an important management function and needs to be controlled efficiently on a project. Safety statistics should be reported in the same manner as cost, schedule, and quality. In EVM, cost schedule index (CSI) is calculated on the basis of cost performance index (CPI) and schedule performance index (SPI) only. We present a conceptual model to determine construction safety index of projects and propose a new total performance index linking it with CPI and SPI. This index represents the performance of cost, schedule, and safety management of a project. This new index can be named cost schedule safety index (CSSI) or total performance index (TPI). The new index should prove to be helpful to different stakeholders in understanding the project performance in a holistic manner.

Title: Cost and Time Control of Construction Projects, Authors: Yakubu Adisa Olawale,

Abstract: Despite the availability of various control techniques and project control software many construction projects still do not achieve their cost and time objectives. Research in this area so far has mainly been devoted to identifying causes of cost and time overruns. There is limited research geared at studying factors inhibiting the ability of practitioners to effectively control their projects. To fill this gap, a survey was conducted on 250 construction project organizations in the UK, which was followed by face-to-face interviews with experienced practitioners from 15 of these organizations. The common factors that inhibit both time and cost control during construction projects were firstly identified. Subsequently 90 mitigating measures have been developed for the top five leading inhibiting factors – design changes, risks/uncertainties, inaccurate evaluation of project time/duration, complexities and non-performance of subcontractors were recommended. These mitigating measures were classified as: preventive, predictive, corrective and organizational measures. They can be used as a checklist of

good practice and help project managers to improve the effectiveness of control of their projects.

Title: Development of cost engineering system in construction, Authors: Olga V. Didkovskayaa, Olga A. Mamayevaa, Marina V. Ilyinaa,

Abstract: Shaping the methodological basis of professional construction management it is possible to speak about a new direction in the development of the construction pricing – the development of cost management system in construction (cost engineering in construction) integrating the assessment of investment costs, estimated pricing, contract pricing, evaluation of the actual construction costs, and enabling to connect and manage the aforementioned processes. At the same time the concept of cost engineering in construction fixes the engineering, technical and technological basis of all processes directly or indirectly related to the definition of construction costs. The article presents the authors' considerations on the creation and implementation of cost engineering systems in construction at the national, territorial and corporate levels

Title: Value Engineering in Construction Industry, Authors: Miss Apurva J. Chavan

Abstract: Value engineering (VE) is a systematic method to improve the “value” of goods or products and services by using an examination of function. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. It is a primary tenet of value engineering that basic functions be preserved and not be reduced as a consequence of pursuing value improvements. In the United States, value engineering is specifically spelled out in Public Law 104-106, which states “Each executive agency shall establish and maintain cost-effective value engineering procedures and processes.” Value engineering has for its purpose the efficient identification of unnecessary cost, i.e., cost which provides neither quality nor use nor life nor appearance nor customer features. It focuses the attention of engineering, manufacturing, and purchasing on one objective – equivalent performance for lower cost. It results in the orderly utilization of low cost alternative materials, low cost alternative processes including new processes, and abilities of specialized suppliers to procure items at lower costs.

Title: Value Engineering in Construction, Authors: K. Ilayaraja and MD. Zafar Eqyabal,

Abstract: Value engineering is a methodology used to analyze the function of the goods and services and to obtain the required functions of the user at the lowest total cost without reducing the necessary quality of performance. Many a time, Value Engineering (VE) is confused with cost cutting exercises in construction industry. The essential difference between conventional cost cutting and VE is that it involves reducing the cost by improving the functionality through lesser consumption of energy in terms of manpower, materials and machines. In the initial stages VE was used by production engineers for reducing the cost of manufacture. However, it was found that the benefit of VE is much greater if multidisciplinary teams of engineers were involved which would also influence the design team that

is normally the case in construction.

Title: Evaluating Effective Factors on Value Engineering Implementation in the Context of Iran, Authors: Ali Bagheri Fard, Kiyanoosh Golchin Rad, Pejman Ghasemi Poor Sabet, Hamid Aadal

Abstract: Moving forward in 21st century uncertainty of the success and survival of organizations has been increased dramatically. Nowadays construction industry has been faced with several crucial problems namely rapid and unpredictable changes, financial problems, environmental conditions, special requirements, customers' different attitudes as well as profitability of the project. Value engineering has been used in several governments and in the design, construction, and manufacturing of their industries in order to optimize projects, business, manufacturing processes, and also product developments. During the current study, the researchers attempted to investigate the value engineering in construction industry of Iran due to the importance of the implementation of value engineering principles. To this aim, a survey method research has been used in order to collect the required data, by means of a questionnaire. 56 people in charge with construction industry have been participated in the current study. In order to validate the questionnaire, a pilot study has been done among a subsample of 15 participants. By means of statistical procedure the reliability and also validity of the questionnaire has been proved. All of the gathered data have been analyzed deceptively by version 20 of the SPSS software. During the current study researchers had two main objectives namely; identifying factors which hinder value engineering implementation in the construction industry of Iran and identifying the needs of value engineering utilization in the mentioned context.

A. Usage of Cost and Time Engineering in construction Sector

The Companies in the construction sector have a better chance of getting jobs when they use the resources of the country in which they work reasonably, keep their costs at the lowest level and decrease their offer price in comparison with their rivals. But the low offer price is not the only factor for a specific company to get the job. Project must have a high “value”. Value has different meanings for the producing company, owner, user or the designer. The builder company tries to finish the construction with the lowest cost to obtain high profit. Owner wants to get the biggest income from the building. User wants to be able to perform his works easily, while the designer gives more importance to his creation's aesthetics or functions. Purpose, time, quality and cost of every activity that will be realized during the construction process must be determined or estimated beforehand. Owner or user wants to know which feature they will have after the building is completed and with what cost they will have it. Because construction process has many components such as concept, design and drawing details of the project, construction etc., and it is a long-term production, the risk of completion of construction in time, based on the estimated costs (first investment + usage cost) by providing features Suitable

precautions are taken by predetermination of problematic areas via various project planning's and scheduling techniques. But none of these methods includes an examination in terms of the "value". After a building is completed or during the construction stage, comparing the building value with the costs that occur during its construction is not thought about. Although many buildings were built with high costs, desired functions were not provided.

B. Methods that increase the value in construction sector

- Reducing Construction Production Costs:

In constructions, especially in functions with high production costs, the costs can be reduced without sacrificing construction's quality or disregarding customer's requests, by using different materials and/or different methods. Materials, equipment's and stipulated production methods in the specification and projects may become old according to current day or be out of date. In case the suggestion of the contractor for making changes is accepted by the employer, a much more economical solution will be provided for both sides. Carrying out production with better quality by using the suggested methods, in other words improving the quality may be a more economical solution.

- Finishing the Job before Time Schedule:

Finishing the job earlier provides economic benefits in term of reducing general costs. By comparing the cost of job acceleration and the reduced general costs, it can be decided to complete the job earlier. It may not be necessary to accelerate the production speed to finish a job earlier. It may be possible to start earlier. projects.

1) Factors affecting for Time and Cost Engineering

- Management factors
- Environmental factors
- Organizational factors
- Technology

2) Relationship between Time, Cost & Scope in project Success

A project has a definite starting and finishing point and must meet certain specified objectives. Broadly these objectives are required to be achieved by meeting three fundamental criteria i.e.:

- the project must be completed on time
- the project must be accomplished within the budgeted cost and
- the project must meet the prescribed quality requirements.

These criteria can be graphically represented by well-known project triangle

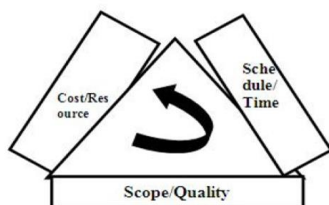


Fig. 1. Triple Constraints in Project Management

C. Cost and time engineering

Construction cost management provides for interconnection of the investment and construction process stages, and transitions from one kind of cost to the other – from investment to estimated, from estimated to contract, from contract to actual, from actual to operation cost engineering involves the engineering approach to pricing in construction, therefore the regulatory framework consists of the rules of town planning, civil and investment legislation, provisions of the technical regulations, etc. At the same time the listed legal acts regulate only some issues addressed by cost engineers. There is no systematic specialized regulation in this sphere.

1) Project cost management tools and techniques

The capabilities of tools and techniques refer to, expert judgment, analogous estimating, parametric estimating, bottom-up estimating, three-point estimates, reverse analysis, cost of quality, project management estimating software, vendor bid analysis Project control automation and relationships of project control to project integrated data bases have been explored earlier. Project Management Software such as Primavera and MS Project describes detailed cost and schedule integration with a focus on exception reporting.

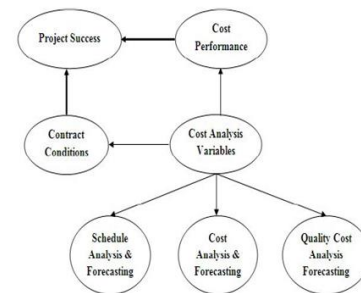


Fig. 2. Project success research model

3. Methodology

- It consists of introduction, history, effect, advantages, disadvantages, salient features. Also introduce the objectives of this study.
- Literature review related to the project.
- Importance of cost and time Engineering.
- Effects of cost and time management in the project.
- Factors affecting for cost and time engineering.
- New technique for the improvements in cost and time management.
- Advantages and disadvantages of cost and time engineering.
- Conclusion

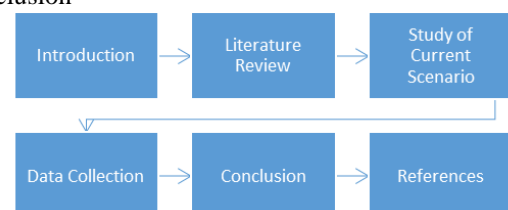


Fig. 3. Methodology

4. Data collection and analysis

To find out various cost and time engineering system(ERP) used in construction projects in pune region is carried out After the site visit is done while site visit the estimated and actual cost and time data of construction project, depending on that data system used and profit this the graphical representation is done.

Table 1
Data

PROJECT NAME	BUILDER	ESTIMATED		ACTUAL		SYSTEM USED	PROFIT %
		COST	TIME	COST	TIME		
KUNJAN	VIVANTA REALTY	12 Cr	2.5 Yrs	11.5 Cr	3 Yrs	ERP	37%
NILAY	SONIGARA	10.5 Cr	03 Yrs	9.6 Cr	3.5 Yrs	EXCEL	30%
SAIPARADISE	SAI	51.8 Cr	5.5 Yrs	47.6 Cr	5 Yrs	SAP	35%
LANDMARK	SONIGARA	12 Cr	3 Yrs	11.2 Cr	4.5 Yrs	EXCEL	31%
BELMONDO	LODHA	522 Cr	12 Yrs	505.72 Cr	09 Yrs	ERP	41%
RADIANCE	YASHADA	22 Cr	2.5 Yrs	21.01 Cr	2.9 Yrs	ERP	38%
LAUREL	SONIGARA	9.6 Cr	3 Yrs	10.04 Cr	4.5 Yrs	EXCEL	31.5%
INDRAPRASHTA	SONIGARA	13 Cr	02 Yrs	10.5 Cr	2.9 Yrs	EXCEL	31.9%
24 WEST	MANTRA	52 Cr	5 Yrs	49 Cr	6 Yrs	ERP	37%
LITTLE EARTH	MASULKAR	375 Cr	11 Yrs	356.8 Cr	12.5 Yrs	ERP	36%
VERONICA	YASHADA	19 Cr	3.5 Yrs	18 Cr	4.5 Yrs	ERP	32%
EPIC	YASHADA	30 Cr	3 Yrs	28 Cr	3.6 Yrs	ERP	35%
VEDICA	VIVANTA	24 Cr	2.5 Yrs	23.2 Cr	3 Yrs	ERP	35%
STERLING BLOOM	YASHADA	28 Cr	4 Yrs	24 Cr	4.5 Yrs	ERP	32%
BLUEWOOD	YASHADA	39 Cr	3.5 Yrs	37.5 Cr	40 Yrs	ERP	31%
BASSILIO	CHANDRARANG	55 Cr	4 Yrs	53 Cr	4.5 Yrs	ERP	35%
GREENSPIRIT	FREEBIRD	17 Cr	3 Yrs	16 Cr	3.5 Yrs	EXCEL	29%
LEGACY AURA	LEAGACY	46 Cr	5.5 Yrs	42 Cr	5 Yrs	SAP	37%
KESAR	SONIGARA	18 Cr	2 Yrs	17 Cr	3 Yrs	EXCEL	27%
TRIOSE	YASHADA	58 Cr	4.5 Yrs	56 Cr	5 Yrs	EXCEL	29%
VISHAKHA	VIVANTA REALTY	37 Cr	4 Yrs	34 Cr	5 Yrs	ERP	38%
SPLENDID SQUARE	BUILDER	46 Cr	3.5 Yrs	44.5 Cr	04 Yrs	ERP	35%
INSIGNIA	MANTRA	52 Cr	06 Yrs	49 Cr	07 Yrs	HIGHRISE	42%
TCG SQUARE	TCG GROUP	12 Cr	1.5 Yrs	6 Cr	02 Yrs	EXCEL	32%
OXFORD EARTH	VIP	79 Cr	6 Yrs	77 Cr	7 Yrs	SAP	31%
PARKLAND	YASHWASTU	128 Cr	4 Yrs	139 Cr	5.5 Yrs	EXCEL	30%
SPLENDID COUNTY	YASHADA	36 Cr	2.5 Yrs	32 Cr	3 Yrs	ERP	36%
MAJESTIC	MAJESTIC	110 Cr	8 Yrs	106.7 Cr	8.5 Yrs	ERP	39%
VANTAGE	YASHWASTU	60 Cr	3 Yrs	74 Cr	5 Yrs	MSP,ERP	45%
WESTSIDE	TCG GROUP	74 Cr	5 Yrs	73.4 Cr	6 Yrs	SAP	42%

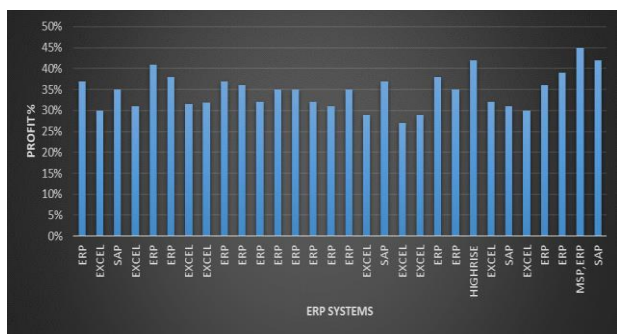


Fig. 4. ERP systems vs. Profit %

5. Conclusion

Cost and time engineering integrating the methods and means of construction cost management is the topical system of construction pricing, while a cost and time engineer becomes a modern expert on pricing in construction. Proper cost and time management turns into the higher productivity, higher quality and Optimum utilization of resources, materials, machines, facilities manpower and money. So Cost and time management is very important in the construction projects

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