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MANAGING CONSTRUCTION OF A MULTI STOREY BUILDING COST EFFECTIVELY AND TIME EFECTIVELY USING CONSTRUCTION MANAGEMENT

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Abstract - Effective cost and time management plays a key role in achieving project success in the construction industry. Different costs and time management strategies help control costs and time on a construction project. Now a day various software used in construction to monitor and control costs and time on a construction project. This research is conducted to identify the most cost-effective and time management strategies and software used to control projects in the construction industry and clients working in the various construction industry. According to the data collected it was analyzed using relative value index (RII) and list items based on percentage of related values. The results will help the construction industry to take steps to improve cost and time performance and identify the most popular use software such as primavera, a Microsoft project in the construction industry.

***Key Words*:** cost management techniques, time management and time management software's

1. INTRODUCTION

Across the construction industry, the successful completion of a project is a key goal. To achieve this goal the construction industry manages cost and time performance. Without proper time management in c the costs are exceeded in the construction project. In this paper to identify the most cost-effective valves and time management strategies and time management software used in the construction industry and the data formed systematic questions and forwarded this question to various professionals such as engineers, contractors, and clients. Based on their suggestion the data was analyzed and rated with reference to the relative value. The various cost management strategies used in the construction industry are budgeting, balancing, forecasting, cost planning and control, cost code and financial reporting and cost reporting and judgment. The most important time management methods followed by construction communities are the critical assessment process, the evaluation process and the review process, the Gannt chart, the historical chart, and the preceding network diagram. Today there is a lot of development in the construction industry, the most widely used project management and monitoring software .The most important software is used to control and monitor the Microsoft excel process, Microsoft project and primavera**.**

Cost Management Strategies

Cost management is an important factor in managing project success and is also an important tool for managing and improving the cost of construction projects. Cost management helps keep the project within budget. Poor cost management often leads to project cost overruns. Essential strategies for cost management are budgeting, balancing, cost planning and control, cash flow forecasting, cost code planning, financial cost reporting and judgment. The entire planning process in a project budget plays an important role, assessing the financial outcomes of the program and providing financial response for programs to be monitored and reviewed [1]. A budget in a building can be a financial analysis of a long-term action plan during a business plan. it is a detailed plan that sets out in terms of monetary policy, financial benefit plans and future expenditures [2], [3]. Good project management practices in a project to find

Effective cost management. project cost management is a partnership within the construction industry and a definition of such things as management, ownership and roster, role and responsibilities of project design, reporting and communication [4], [5], [6]. A complete history of all financial management and all benefits is due to cash flow. Project duration, retention conditions, and payment receipts from the client, are factors affecting cash flow etc. [7]. The purpose of a code of conduct is to change the amount of data that will be identified and coded in order to maximize cost savings throughout the contract period [8].

A successful contractor should have a strong and accurate financial plan, good knowledge of project costs, accurate and reliable cost report, etc. [9] .Finance and expense report for the recording of financial transactions such as internal and external payments and amounts owing and arrears [10]. Judgment is very important in cost management

.without judgment any cost management methods can be used [11]. A good forecasting strategy should incorporate both historical data based on trend and competence .a judgment based on construction knowledge and experience [12]. The relationship between judgment and alternatives can be summarized as the process and judgment are called recommendation [13].

Time Management Strategies

Time management is an important strategy to ensure the completion of projects on time. Without timely management, many problems will arise such as overtime or overtime in a construction project. Valuable time management strategy Gantt chart, landmark chart, critical route method, system test and review method, pre-network drawing. The Gantt chart method is widely used in project planning and management .it is a simple

schedule adjustment and is a graphical representation method [14]. The C.P.M or Priority Route was developed by DuPont and Remington rand Univac in 1957. The main objective of this team was to reduce the time required to do plant rehabilitation, maintenance, and construction work. Developed as a project [15] .The Management Tool helps to improve project planning and management, project support management to ensure that the project is completed on time and on budget [16].

The PERT or system analysis process is a tool used to plan, control and review a project is the task of managing the firmstar missile program firm [15], [17]. PERT provides an assessment of the probability of reaching a specific milestone or achieving a complete completion of a project within a normal time period [18], [19]. The Precedence Network Diagram is almost identical to CPM and is additionally widely used in the construction industry. The arrows used to connect nodes wherever they become a network to define interactions between functions [20].

Time Management Software

The time management software program helps to control and monitor the project whether or not the project benefits of many time management software used to plan construction that the calculation is fast and there are no errors. The most widely used software within the time management industry is Microsoft excel, a Microsoft project, and a primavera project planner. At Microsoft excel there are various types of templates to be used for project planning such as excel project management templates, Gantt chart and project planning, project reporting, Microsoft Excel project managers formulas and more [12], [21]. Microsoft Project has a variety of options to support project management such as manual editing where this option may be used to set the duration of the project once, the start and end date on purpose and then click [12], [21]. Primavera Project Planner can be presented as numbers, PERT, Gantt charts, bar charts, and diagrams [12], [21].

2 DATA COLLECTION

The data for this study were collected from a systematic questionnaire from engineers, contractors and clients involved in various types of construction projects.

1. Identify costs and time management strategies.
2. Identify important time management software
3. Analyze using the relative value index (RII)
4. The setting of a feature based on their level of importance
5. Make a proposal for cost control and time management in a construction project.

3 QUESTIONNAIRE SURVEY

The design of the questionnaire focused on research objectives with a view to answering the research question. The Research Questions have been referred to the books [1] to [23], and completed with the help of highly experienced specialists, helping to identify the relevant questions needed and presenting them clearly and special care is done to document the simple questions.

Table 3 represents the year of professional experience. This table shows 40 members with six to ten years of experience and 32 members understood by respondents. The content involved in the questionnaire is divided into two main categories. The first part is about general information about the respondent such as (1) Name, (2) Contact address, (3) Experience year, (4) Respondent's appointment, (5) Type of project he is working on, (6) Academic qualifications and second part of respondents were asked about costs and time management tools and techniques and software used to manage time in their project. A 5-point rating of Likert was used to understand staff perceptions such as

1. Represents the smallest result,
2. It works best,
3. Medium,
4. Very effective,
5. Is very effective in terms of qualifications.

4 RESEARCH METHOD

Most of the points are identified by a questionnaire from experts working in various construction industries. The study was conducted with a question posed by various construction experts. These professionals include engineers, contractors and clients. In addition, all professionals are selected based on their experience and special care should be taken with their educational qualifications. All respondents who participated in the survey with the minimum qualification of their qualifications are (D.C.E) the majority of respondents completed (B.E) and few respondents completed (M.E). The data collected was analyzed in the form of a relative value index (RII). This analysis involves measuring different causes in terms of important related indicators.

- Defendant's personal information
- Types of projects the respondent has worked on
- Obtain tools and strategies to manage significant costs and time
- Identify Essential Software to manage costs and time on a construction project
- Make a cost management proposal

Collected Data

Table .1Respondents Involved In the Survey

No of questionnaire distributed	172
No of response received	136
No of invalid (Incomplete) responses	15
No of valid responses	121
% of responses received	88.97
% of invalid responses received	11.03

Table 1 represents the total number of 172 questionnaires distributed but only 136 active questions were returned, of which 11.03% were invalid or incomplete which means that 88.97% of active answers were received. Table 2 shows the experts participating in the study with a total of 72 engineers which is 59.50%, 34 contractors with numbers 28.10% and 15 client numbers affected by 12.40%. year of professional experience. This table shows 40 members with 6 to 10 years of experience and 32 members with 11 to 15 years of experience and only 22 with more than 15 years of experience.

Table.2 Professions of the Respondent

SL	Professionals	No of respondents	Percentage of respondent	Cumulative percentage
1	Engineer	72	59	59
2	Contractor	34	28	87
3	Client	15	22	100

Table.3 Respondent Year of Experience

Year of experience	1 – 5	6 - 10	11- 15	>15	Number of respondent
Engineer	20	25	16	11	72
Contractor	5	12	9	8	34
Client	2	3	7	3	15
Total	**27**	**40**	**32**	**22**	**121**

5 Method of Data Analysis

Data were collected using a questionnaire. A 5-Point like scale was used to understand Employee view as 1 very low effective, 2 low performance, 3 medium performance,4 high performance and 5 very high performance. cost effectiveness evaluation management strategies calculated using Relative Importance Index (RII). 15 Amount three-group questions such as (cost to manage, to manage time and time management software). When given individually category of respondents-engineers, contractors and clients. The same method has been used by various researchers to analyze data collected from a list of questionnaires as indicated in the text books. Sambasivam et al., Use the same method investigate causes and effects of construction delays in the Malaysian construction industry. RII will be calculated by the following expression [22]. The index was ranked for engineers, contractors and clients. The group index is the average of relative importance index of the delay factors in each group.

The group indicator is a measure of the delay factors in each group. Agreement between the ratings of any two parties is measured using the coefficient of standardization. The rank coefficient (p) is calculated as follows (Mendenhall et al. 1993) and this method is used by Aadi. A. Assaf [23]. Spear aggregation scale (rs) was used to indicate the degree of agreement between the levels of any of the two components. The spear-level correlation is a non-parameter test. Nonparametric testing is also referred to as non-standard testing. These tests do not require conventional thinking or thought Homogeneity of variance.

Where d is the difference between the levels given by any two respondents for the same reason and the number 1cause, in this case are 15 factors. The delayed coefficients coefficients are 0.96, 0.95 and 0.98 for developers, contractors and customers respectively.

Significance test

In order to determine whether the parties have shown significant agreement at their levels the myth that engineers and contractors, contractors, contractors and clients, clients and engineers do not comply with the standard has been tested using a t-test at 95% confidence level. . The null hypothesis has been rejected in all three cases. Another hypothesis that all three groups

This study identifies key cost and time management strategies for a project and the most effective time management software used by the construction industry. Based on the relative importance of contractor and customer contractors the overall cost of cost management strategies predict Cash Flow (RII = 81.73), Planning and Cost Management (RII = 80.86) and Estimate (RII = 80.25) these three factors are very high. related value is about these three factors with RII over 80% from developers, contractors and customers. In Time Management strategies the five key elements are effective project management from the top three successful strategic strategies (RII = 81.17), Program Evaluation and Review System (RII = 79.66) and the Gantt chart (RII = 79.62) these three. features are more than 75% RII. Time management software is similar to primavera (RII = 81.86), Microsoft project (RII = 81.63) and Microsoft excel (RII = 4.86). These three software were widely used in the construction industry, but Microsoft excel is now the oldest in the era compares these three tools

FACTORS		ENGINEER		CONTRACTOR		CLIENT		AVERAGE	
		RII	RANK	RII	RANK	RII	RANK	RII	RANK
COST MANAGEMENT TECHNIQUES									
CM1	Budgeting	81	2	77	4	80	3	79	4
CM2	Estimate	80	3	79	3	81	2	80	3
CM3	Cost Planning And Control	78	4	85	1	78	4	80	2
CM4	Cash Flow Forecasting	81	1	80	2	82	1	81	1
CM5	Cost Code Systems	69	7	69	6	62	7	67	7
CM6	Financial Reporting And Cost Reporting	75	5	70	5	76	5	73	5
CM7	Judgement	74	6	67	7	64	6	68	6
TIME MANAGEMENT TECHNIQUES									
TMT1	Gantt Chart	79	3	79	2	80	3	79	3
TMT2	Milestone Chart	64	4	74	4	77	4	72	4
TMT3	Critical Path Method(C.P.M)	80	1	80	1	82	1	81	1
TMT4	Program Evaluation And Review Technique (PERT)	80	2	77	3	81	2	79	2
TMT5	Precedence Network Diagram (PND)	59	5	74	5	70.67	5	68.1	5
TIME MANAGEMENT SOFTWARE									
TSM1	Microsoft Excel	60	3	80	3	84.00	1	74.8	3
TSM2	Microsoft Project	79	2	84	1	81.33	3	81.6	2
TSM3	Primavera Project Planner	80	1	83	2	82.67	2	81.8	1

Predicting Money Flow

Cash flow forecast is the most important factor in cost management in this study of the total cash flow index (RII = 81.73). A good cash flow analysis can be very important for a business plan in construction. All the ongoing strategies, strategies, and activities of a project are meaningless if you do not have enough money to pay off debts and cash flow forecasts predict your financial needs in advance.

Cost Planning and Control

Cost planning and control are essential in the construction industry to control cost effectiveness. From this study the relative value of the whole (RII = 80.86) .The practice of cost planning and control involves the establishment of project-oriented costs and success. As opposed to a planned operation in a deviation from the system. An Important Way of the Way

The Critical Path Method (CPM) is one of several related strategies for project planning. CPM is for projects built on specific "tasks". If some of the tasks require some tasks to be completed before they can start, then the project becomes a complex web of tasks. In this study, the key to the important time management tool was to identify the longest route. CPM was an important factor and their overall level (RII = 81.17).

Programme Evaluation and Review Technique

Method of Evaluation and Review System The pert is ranked second within the time management tool and its overall value indicator is (RII = 79.66). for those who participate in research and development programs which is a very important time. This process takes into account the three factors that contribute to the successful achievement of research and development goals such as human resources, time, and money.

Primavera

It is an effective project planning software now used in the construction industry to be ranked first in time

management software (RII = 81.86). Primavera is a very efficient project management software .it is now a recognized standard of quality project management Primavera P6 Professional Project Management. It manages large, highly refined and varied projects. Plan up to 100,000 job projects with unlimited resources and a vast number of target plans.

Microsoft Project

Microsoft Project receives second-party operating software and related key indicators (RII = 81.63) Microsoft Project may be a project management software program developed by Microsoft, which is designed to assist the project in creating concept, distribution of services. , tracking progress, managing the budget, and evaluating workloads.

6 CONCLUSIONS

Cost management and time management strategies are essential to a successful project in the construction industry. Time management software helps to control and monitor a project whether the project is moving in the right direction or not. Based on this the strategies for managing research costs such as cost flow forecasting (RII = 81.73) and cost management planning are the key to cost control. Time management strategy CPM (RII = 81.17) and PERT (RII = 9.66) is an effective time management method for construction and Primavera, Microsoft Project and Microsoft Excel are the most common and effective software packages used in the construction industry.

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