Analysis various types of infrastructure project with respect Activity, Cost and Time

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ABSTRACT:

Construction industries have various types Projects. They have different activity , completion period and Costing , those organization engages in this industry required proper planning to complete this project with respect to time, if specific planning and calculation use this organization can increase their profit ratio with respect to time and increase the cash flow during financial year, which help to increase the turnover of organization. In this Paper Compere the Construction Project with each other and determine the Activity profit ratio with respect to time, determine the cash flow during project completion with the help of Simulation network, the simulation network compare this project each other depends upon practical input and give the results, this results can help to organization to determine the project profit ratio with each other, decision making to commencement of project.

Keywords: specific planning, calculation, activity, profit ratio, simulation network.

INTRODUCTION :

The Indian construction industry has various type of project. Example –A)Infrastructures- Road, Bridge, Building, Compound Wall, Telecom Infra Structure B)Irrigation Projects- Pipe line , Dam , Elevated Storage Reservoirs C)Earth Work – Earth Excavation and Transportation ,Canal deepening and widening, Deep Continues counter trenchs This various types of project have different Factor for Completion.

To compete this project required planning with respect to Activity, cost, time, and quality and organization profit. depends on some Practical factors and Construction management Study try to increase the organization Productivity and performance ,it means minting the technical performance, schedule of working and within budgetary cost . In this project some simulation network create and give the some practical input on various factor depend upon -project duration(Time) ,Process, man power , Machinery (Quality), cash flow and margin and try to improve the performance and Profitability of organization and give some conclusion to selection of projects. And repetition of project for improving performance and technical improvement in profitable area.

Infrastructure projects are different from other projects. In order to define their success, we need more dimensions to consider these differences for a wide range of stake holders, and manage a high budget influenced by political decisions, long time span for planning and executing etc. infrastructure projects are “uncertain, complex, politically and involving a large number of partners” and “when complex projects go wrong they can go horribly wrong” with several financial consequences. The quality of work has a big influence on improving the economic conditions (Spang, 2016)1. Improving economic conditions includes the business conditions and organizational capabilities. Use of simulation network in this study we try to make good decision model to analysis different infrastructure project to each other to determine the profit and loss .this will help to improving the organization productivity and Profit.

Significance:

Construction Industry have various type of Working Areas And Different projects, all this projects have deferent activity, completion time and cost in this project we try to compere different projects with each other in simulation network and make some conclusions to make an

organization more productive and more profitable depends on selection of different or same project and make organization specialization or Technically strong in same project.

Aim:

The aim of study 'Increases the Productivity of various types infra-Structure project with respect to Time, cost, cash flow and make organization more profitable'

Objectives:

A. To find out the various infrastructure projects Activity, duration of completion and cost.
B. To analyze the different infrastructure project Constraints with respect to Cash Flow at the time of work.
C. To evaluate the productivity of various Infrastructure projects with respect to organization profitability.
D. To evaluate methodology for increasing the profitability of organization with respect to road constructions.
E. To evaluate actual Cost working of Project by live working in single project.
F. To compare exact Cost required for with ANN Technique.

2. LITERATURE REVIEW

"Analysis of Duration and Cost Estimate of Construction Projects through Computer Simulation", Darko Duki, Tamara Mari, Dubravka Babi. Proceedings of the ITI 2007 29th Int. Conf. on Information Technology Interfaces, June 25-28, 2007, Cavtat, Croatia[1]

Computer simulation is used in the field of construction project management as well. Its us for solving the scheduled problem can significantly solve for project manager's decision-making,especially in today's complex operating situation .in this paper model of analysis of time requirement and estimated cost of construction projects based on a computer simulation. The theoretical work for generating random numbers put by the triangular distribution. Most help full think statistical analysis which use for results in establishing an confidence interval for the mean project duration.

PERT method assumes the duration of each activities used by random variable with a known probability density function. Which theoretical distribution will be used in the time risk analysis depends on the type and characteristics of a particular project, as well as on the project manager's preferences. In this paper how the triangular distribution in Monte Carlo simulation can be applied and what can be achieved with it. The triangular distribution is determined by three parameters – minimum value (a), most likely value (m) and maximum value (b)The theoretical framework for conducting simulations in the presented model is established by the triangular distribution. Although quite simple, it has characteristics that reflect well the three time estimates of construction activity duration. To provide better understanding, in this paper determined the probability density function and the cumulative probability function of such random variable, and then formulated its basic parameters. Furthermore, the procedure of generating random numbers from the triangular distribution has been explained. The sum of duration times of all activities obtained through simulation, which are found on the critical path, represents the total project duration.

"Strategic Cost Management For Construction Project Success: A Systematic Study's T. G. K. Vasista Ph D Research Scholar SunRise University, Alwar Civil Engineering and Urban Planning: An International Journal (CiVEJ) Vol.4, No.1, March 2017 DOI:10.5121/civej.2017.4105[2]

Large construction projects are complex and dynamic. Projects start with ideas, investments and efforts. However, most of them do not achieve success. Unsuccessful projects is lack of knowledge on time, cost, scope and quality. The objective of the research is to considering only the s, time, cost, quality and scope as process success parameters and how cost element influence the project success when all other factor or element other than cost are represented in terms of cost factor with the contract conditions as basic rules or constraints that drive the strategic cost based on apply the CRASP methodology concept. The concepts of benchmarking provide meaning of project success when allowing to distributing the meaning of customer profitability to the project providers (project owner and contractors).

A project has a fix starting and finishing point and must meet specified objectives. Broadly these objectives are required to be achieved by three fundamental criteria i.e.: (i) the project must be completed on specific time (ii) the project must be completed within the budget cost and (iii) the project must be prescribed quality requirements. There is no practical guideline for measuring such criteria. Therefore in this paper an attempt is made to measure and study the quality cost towards indicating the evaluation of technical performance in construction projects. Quality cost can play a medal role in project management from a cost of project and consequently contributes to the success of the construction project

'Neural network as a simulation metamodel in economic analysis of risky projects Adedeji B. Badiru a, „ David B. Sieger b*a Expert Systems Laboratory, School oflndustrialEngineering, University of Oklahoma, Norman, OK 73019, USAb Department of Mechanical Engineering, University of Illinois at Chicago, Chicago, IL 60607-7022, USA*Received 26 July 1993; accepted 16 October 1996[3]

An artificial neural network (ANN) model of risk economic study of projects is presented in this paper. Outputs of conventional simulation structure are used as neural network by some inputs. The neural network model is then used to calculate the minimum returns from an investment project. The indirect cost of the project include the investment, the rate of return, investment period. Back propagation method is used in the neural network modelling. Hyperbolic tangent functions and Sigmoid are used in the learning aspect of the system.

Study of result the outputs of the neural network model indicates that more precise workability can be achieved by simulation with neural network. The good network able to predict simulation output based on the input values with good accuracy. This helps in analysis of the future planning of the investment in the project without having additional expensive and time consuming simulation experiments.

This paper studied an artificial neural network model for cost analysis of projects. Outputs of simulation models are used as neural network inputs. The neural network model is then used to calculate the returns from an investment project having stochastic parameters.

Innovation in project-based, service-enhanced firms: the construction of complex products and systems David M. Gann), Ammon J. Salter *SPRU-Science and Technology Policy Research, UniÍersity of Sussex, Mantell Building, Brighton BN1 9RF, UK*[4]

This paper studies the management of innovation within firms constructing complex projects. It based on a study of how construction, design and engineering firms develop produce buildings and structures. Researcher contends that these projects, service-enhanced forms of enterprise are not adequately addressed in the innovation literature.

Project based firms reply on merging technical expertise from other organisations in order to deliver their own technical skills, usually in one-off process. The paper studied that these firms are only able to effectively control and reproduce their technological capabilities by applying project and business processes within the firm. Results show the need for a better conceptual understanding and new management practices to link business processes and project. The paper give idea of framework IT-based decision support systems for achieving this, explaining the dynamics of project-based firms and how they can improve performance across the projects.

Information systems are likely to change the decision-making and the nature of decision with the implementation of business management and project management tools. Successful implement of IT-based decision support systems in leading construction firms demonstrates that implement in processes are quite different in character from conventional approaches. The use of IT systems is resulting in fundamental changes to the sequencing, timing and ranked of decision-making. The most important aspects of change are: I) the increasing the speed of decision –making. II). to make information readily available where and when it is required; and III). Increased visibility of decision-making processes, including access to other people's decisions. Engineering and construction firms not able to achieve all of these changes alone. Emerging forms of service-enhanced, project-based production are likely to require new different systems of innovation support at national and international levels.

2.1.5 Practical Multifactor Approach to Evaluating Risk of Investment in Engineering Projects Abraham Warszawski, F.ASCE,1 and Rafael Sacks2 DOI: 10.1061/~ASCE!0733-9364~2004!130:3~357[5]

Risk analysis is critical in enabling management to make informed decisions regarding the budget viability of engineering projects. In most of construction projects, risk assessment methods are not used because the detailed information they required is not available to the average project owner or manager. As a result, risk assessment is limited to simple sensitivity analyses. This paper presents a practical thorough method in which the economic risk in a construction project can be calculated with input information of various levels of detail. The proposed ''multifactor'' method includes consideration of interdependence between a
project's risk factors. The principles of the method are explained, its application to a big construction project is illustrated, and the findings are discussed.
A practical and transparent method for risk analysis of investment in building construction projects has been developed, implemented in software, and tested. It enables a building project owner/developer to: 1. Assess the economic risk associated with their project very quickly and with relatively little input information and 2. Identify the ways in which he/she can intervene to ameliorate the risks, and assess the effectiveness of such interventions.

The multifactor method can operate with risk factors at any available level of information detail. This is an important advantage, because the difficulties associated with problem formulation and input data elicitation are the major obstacles to effective risk The method could be both enhanced and simplified—from the point of view of the nonprofessional user—if default probability distributions for typical activities were made available. Such distributions should be based on historic duration and cost distribution data for completed projects.

Research Gap:

In Past Research methodology doesn't find the project productivity with respect to Time and Cost and productivity with respect to cash flow so this research gap can't increase the organization productivity by selection of project with compere to others project.

Problem Statement:

In Construction industry have many types of Infrastructure project they have deferent or same activity to competition, for this different activity required deferent material ,machinery ,deferent labors and cost and time to completion. Organizations have various opportunities to take different project but depends upon the time of completion, and cash flow also specialization of Activity's we compere the various project each other. Organization also improve the performance by selecting same types of project it is beneficial to organization or not this will find in this study also cash flow requirement for all this activity and allocation of cash flow requirement also define. Depends upon the comparison we try to improve the organization performance, profitability and management strategies to specialization in same activity or project.

3. METHODOLOGY:

Primary and secondary data is studied first, Primary data were collect from the interviews from a mini-survey and from conversations with supervisors at deferent project. In addition, documents from the four projects were used as primary data in order to describe the characteristics of the project. The secondary data collect mainly from resulting in the literature study and books. The literature study made before and during the interviews. The purpose of the literature review to get an understanding of project, success criteria, and time and cost for activity for completion and how they are related in order to form appropriate interview questions. The results from the interviews brought up new subjects that were necessary to be include in the Paper. Thus, the data from the interviews conduct are limited to the project management of the four projects.

Table 1: Number of managers and their roles

Roles	**Case 1** **Flexible Pavement (Bitumen Roads)**	**Case 2** **Rigid Pavement (Concrete Road)**	**Case 3** **Compound Wall (Building Work)**	**Case 4** **Cable trench (RCC Drain Work)**
Project Manager	1	1	1	1
Senior Engineer	1	1	1	1
Junior Engineer	1	1	2	2
Surveyor	1	1	2	1
Supervisor	2	2	3	2

After the interview simulation network is crate on Microsoft excel and give the practical input relates to Activity, Time ,Cost And Cash Flow Duration of Project for all this four cases .In simulation network depends upon the input some strategic calculation and observation the comparison is done on hidden layer and final output is give bye simulation network this more easily calculated(in fig 1) dependents upon the output organization can define the more profitable project and capability of organization of hand the same type of the project and its help to improve the productivity of project.

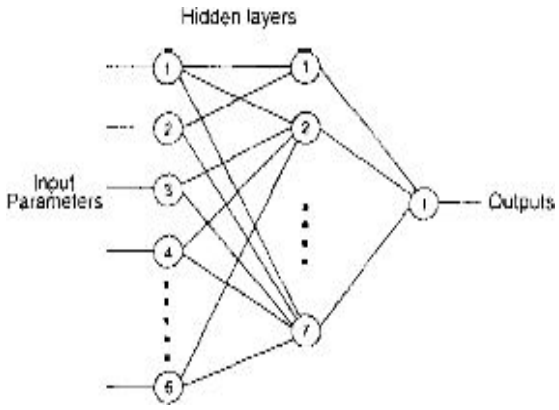


Figure 1: Simulation Network Diagram

4. THEORETICAL CONTENTS:

In this study analyzed the various infra project with respect to Activity, time, cost, cash flow depends upon some observation the various infra project have different activity, time and cash flow also different profit and loss margins so, In this study we try to summarized all this observation and create on simulation network to find the best profitable project compering to other infrastructure projects.

To compete this project required planning with respect to Activity, cost, time, and quality and organization profit (Fig-1). depends on some factors and Construction management Study try to increase the organization performance ,it means minting the technical performance, schedule of working and within budgetary can improve the profitability of organization by repetition of project or by specialization of same type of project in the same area.

Artificial neural networks (ANN) form a branch of artificial intelligence. Neural networks is a connection of simple processing elements capable of calculating the data which given by external inputs. The Calculating element is referred to as a neuron. Every neuron is connected to minimum one other neuron in a mesh-like fashion. A network consists of cells that are organized in one by one layers. There are three layers in a neural network: the first input layer, second one is hidden layer(s), and the last output layer. The inter connection of cells all layers called the transmission of information between cells. Neural networks learn by evaluating changes in input. Learning can be either supervised, unsupervised, or reinforcement. In supervised leaving, each response is guided by specified parameters. The computer is instructed to compare inputs to ideal responses, and any discrepancy between the new inputs and ideal responses is recorded. The network then uses this information to guess how much the newly gathered data is similar to or different from the ideal responses. In this paper simulation network is crated, compare the project each other by activity, time.

5. DATA COLLECTION:

Primary Data

In the First Primary Stage data is Collected of Four Project 1) Road Project – Bitumen Road 2) Road Project- Concrete Road 3) Building Project – Compound Wall 4) Concrete Project- RCC Drain, The Data is related to Activity, Cost and Time required for the work Completion.

Secondary Data

In the Secondary Data all the data which is collected and Inserted with input parameters in to the simulation network which created in excel format and compere all the project to each

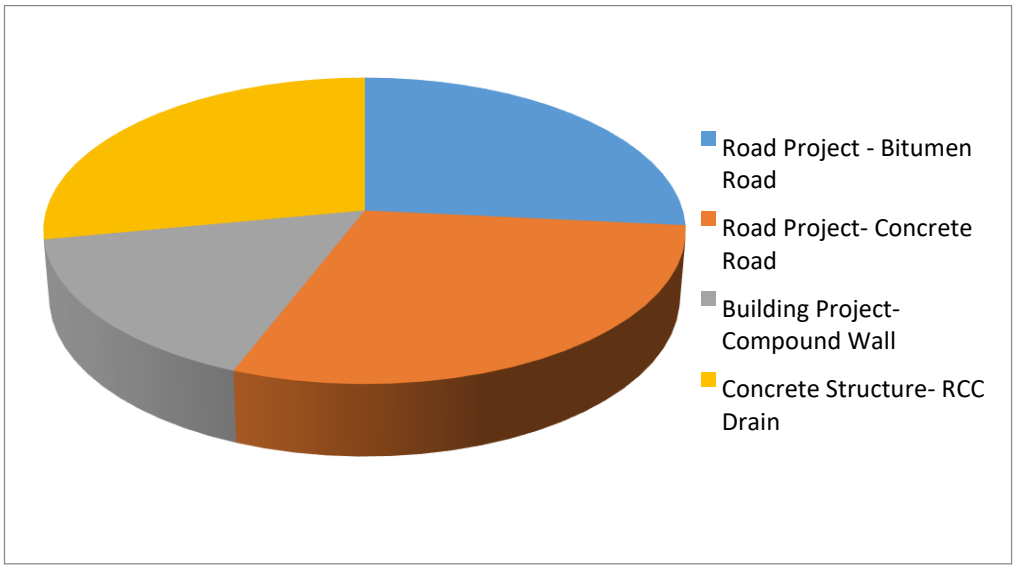
other with respect to Activity duration required for completion and profit depends upon this comparison we can choice the best project for organization to increase the profit ratio yearly.

6 RESULTS:

1. Calculation of Actual profit ratio by Company and DSR rates comparison of each project:- Table N0-2 :

Results Given By Artificial Neural Network

Sr No	Project Name	Total Activity	Activity Duration	Project Tender Cost (Rs.)	Total Project Cost (Rs.)	Profit in amount (Rs).	Profit in Ratio
1	Road Project - Bitumen Road	95	375	291502835.17	236117296.49	55385538.68	19%
2	Road Project- Concrete Road	30	334	269522104.5	212922462.6	56599641.95	21%
3	Building Project- Compound Wall	18	155	53589535.92	47406685.91	6182850.01	12%
4	Concrete Structure- RCC Drain	14	353	151951189	121484975.6	30466213.39	20%



Graph 1. Comparison between all Projects with Respect to profit percentage

1. **Calculation of One Project which can give maximum profit In 5 years of tenure if organization make Specialization in one type of project with respect to their actual working cost** Compression on maximum number of project complete in 5 year and profit given by each project.

Table No 3: Comparison of Maximum Profit Project give in Five year

Sr.no	Project Name	No of Project Complete in 5 year	Maximum Profit from 1 single project (Rs)	Total Profit In Year (Rs)
1	Road Project - Bitumen Road	5	55385538.68	269542954.9
2	Road Project- Concrete Road	5	56599641.95	309264510.6
3	Building Project- Compound Wall	12	6182850.01	72798072.7
4	Concrete Structure- RCC Drain	5	30466213.39	157509460.2

1. From above comparison conclude that Second number **Road Project "Concrete Roads"** Gives maximum profit in single project also in whole year project comparison with respect to other project
2. As comparison of project with respect to time to complete the activity conclude that activities of Dismantling, Excavation takes minimum time to complete and activities such as Earthwork, Bitumen, Concrete gives maximum profit with respect to other activity. Labour requirements for this activity is lease because maximum work is done by machinery such as Excavator, Graders, Rollers is done only, also we have use critical path method to minimize the days required for completion of project which is not affected on RCC Concrete road work therefore management of work is less tedious with respects to other project, which helps to specialization in that type of project is easy and maximize the working efficiency of organization.
3. In Road Project Bitumen Road excavation activity is maximum in quantity there for profit ratio of this project is maximum with respect to other project.
4. Simulation network helps to compare the other project in minimum time to find out maximum profit with respect to time and increase the profit and productivity of organization.
5. Simulation network standardize the process which compare to other project before taking the project for execution, ,which helps to finalized the profit with respect to other project which directly helps to organization profit with respect to time

6. CONCLUSION:

The construction industries struggle with inefficient processes much to be desired. In order to meet this challenge the construction industry must become more efficient by using fewer resources. Small changes in the operational cost , which increase the efficiency, can make substantially changes in profit. By using simulation network we can increase the specialization of organization and increase the productivity of organization. Which directly effect on profit and loss sheet of organization And after having a view on the project cases it can be concluded that due lack of knowledge about simulation network techniques, most of the working people in the construction industry are unaware about the benefits of it, which is the main demerit of implementing the techniques and gaining profit from it.Initial proper knowledge and information should be provided among the management team and other people in organization to gain maximum profit in minimum productive time.

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