Chapter 9
Improving Financial Estimation in Construction Management Through Advanced Computing and Decision Making

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ABSTRACT

The firm or the government invites bids against the tender whenever it requires third party to provide services to it like undertaking construction projects, delivery of material, etc. Interested parties gives their bid prices in sealed envelopes and the lowest bid rate wins the contract. However, contractor, in order to win the contract, may not estimate the cost of the project accurately as the estimation of factors contributing to the costs may be based on educated guesswork according to the past experiences. This increases the chances of the final cost of the project to go up in the end, which is to be borne by contractor. Hence, accurate and effective cost estimation is required. This chapter proposed an algorithm to provide a proper way for the contractors to estimate the accurate cost of the project for which they provide bids. This chapter provides an effective solution to the problem of inaccurate cost estimation. The algorithms are automated using a web-based tool.

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INTRODUCTION

When an tender for undertaking activity related to projects are released, inviting bids, there are many contractors that would like to bid for it. The contractor must be technically and financially stable to compete for the specific project. Usually, the one with the lowest bid wins the tender. The cost specified by contractor is sometimes based educated guess work, which leads to cost overruns during the course of project development. This educated guess work comes from the past experiences of the company and similar projects done. Not accurately identifying the elements of the cost and risks leads to the higher final cost of the project than what was estimated earlier. Accurate cost estimation and completing the project within estimated cost leads to higher success (Aziz, Memon, Rahman, Latif & Nagapan, 2012). It had been reported that the on average the cost overrun in projects is 5–10% of project cost (Azis et al, 2012). It had also been identified that the cost and time over run is approximately 5–10% of contract duration and price of project (Rahman, Memon, Nagapan, Latif, & Azis, 2012).

An accurate and effective cost estimation is required to avoid the mismatch between estimated cost and actual costs. Further, the bids obtained by the firm (that invited it) provides it an opportunity to further lower the project cost and increase quality of work by awarding contract as subcontracts to contractors, on basis of lower elements of cost specified in bids. There are various factors that are taken into account while doing the cost estimation of a project like - the cost of the labor, cost of machinery, land cost, and type of project, resources, etc, which varies from project to project and firm to firm. To illustrate the working of the proposed algorithms, the cost factors used are generic across many contractors. These contractors was interviewed by authors to identify generic parameters that make up the cost. The different factors affecting time and cost of the project is reported in (Potty, Irdus & Ramanathan, 2001). However, to consider multiple cost factors, the algorithm is well adoptable to accommodate the extra variables.

This chapter proposed two algorithms, first; to lower the cost of projects by awarding subcontracts and second; to have effective and accurate cost estimation of the project, which can help the contractors in their endeavor of effective construction management. The first algorithm does not employ any expert judgment except that contractor may use expert judgment for cost estimation. Second algorithm may employ expert judgment and historical values to update the estimated weights. The partial application of expert judgment helps to incorporate the domain expertise of experts and consider the variability issues and overconfidence issues related to expert judgment as reported in (Azis et al, 2012).

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