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Time Delay and Cost Overrun in Qatari Public Construction Projects

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Abstract

This paper investigated cost overruns and delays in Qatari public construction projects. An extensive review of regional and international publications was conducted to get a better understanding of the problem and the various methodologies that were used to analyze it. The data that was collected from Qatar public work authority ASHGHAL included 122 public road, building, and drainage projects. ANOVA method was used for data analysis and inference. A regression analysis was also conducted to establish the relationships between project contract prices and cost overruns and to develop prediction models for estimating cost overruns. Two linear regression models were developed for predicting cost overruns for building and drainage public projects, respectively. Cost overruns for building projects increased with contract prices. On the other hand, cost overruns for drainage projects decreased with increasing contract prices. A significant effort was spent in collecting data on cost overruns and delays in public construction projects. However, data confidentiality did allow the collection of enough data to ensure the robustness of the developed regression prediction models.

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1. Introduction

Changes are facts of the construction process. They are issued to respond to newly developed circumstances. Extensive and poorly managed changes may have significant negative impacts on project time and cost performances. Two major problems facing the construction industry are project delays and cost overruns. In today's highly competitive economic environment, the need for completing construction projects within the stipulated cost, time frame, and expected performance expectations is becoming increasingly important.

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In the state of Qatar, the public projects that were performed between the years of 2000 and 2013, had a 54% cost overrun and a 72% time delay. On the other hand, the maintenance projects during the same period had both 50% cost overrun and time delay. Thus, there is a real need to investigate time delays and cost overruns in Qatar public construction projects because of their criticality and the limited number of published studies that addressed these issues.

2. Objectives and Methodology

2.1. Objectives

The main objectives of the study are to:

- Analyze statistically time delays and cost overruns commonly found in Qatari public projects.
- Develop prediction models for predicting project cost overruns based on the contract price value.

The scope of the study is limited to public construction projects whose data were obtained from public work authority (ASHGHAL).

2.2. Methodology

The methodology included six phases, namely, data collection, data mining, statistical data analysis, and building conclusions based on statistical findings. A total of 122 construction projects were studied with a focus on construction phase only. All construction projects were completed between the years of 2000 and 2013 and all claims were settled by 2013. All construction projects were lump sum contracts and had the traditional delivery method of design-bid-build. The collected data included project category, project type, contract cost, contract duration, duration and cost at completion at completion. Time and cost overrun percentages had been calculated, using this data. The data was studied using the analysis of variance (ANOVA) and regression analysis. MS Excel 2007 software was used for both analyses.

3. Literature Review

Time delays and cost overruns usually lead to adverse effects on the growth of national economies, contribute to major financial losses, and hold back the development of the construction industry. A long-term study of a number of public works projects, which was conducted in the state of Nevada in the United States, showed the negative and costly impacts of time delays. The study investigated several design-bid-build state construction projects between the years of 1991 to 2008 and concluded that large size and long-duration projects had significantly higher cost and schedule overruns than smaller size and short-duration ones [1]. The main factors for time delays and cost overruns are: 1) scope definition, 2) coordination of roles and responsibilities among involved parties, 3) initial estimation and contingency planning, and 4) monitoring and control systems [2]. Most construction projects in developing countries are characterized by time delays [3]. The projects with extensive delays may end up losing their economic justification, which in turn may result in the termination of the project [4]. The following complications due to delay increase in governmental projects were identified: 1) confusion regarding public development plans, 2) disturbance of the budget execution plan, and 3) public inconvenience resulting from project delays [5].

The following major causes of construction/delivery delays were reported: 1) insufficient data collection and survey before design, 2) higher than expected increase in costs due to inflation, and 3) repair/reconstruction work due to errors during construction [4]. The three most important causes for construction delay were improper planning, poor site management, and inadequate and/or limited experience [6].

The majority of cost overruns are encountered in lump sum contracts, fewer occur in unit-price contracts and even less in reimbursement contracts [7]. They reported the following causes of cost overruns: 1) awarding contracts to the lowest bidder; 2) site conditions; 3) incompetent subcontractors and poor site management; and 4) inaccurate estimates and client-led change orders. The following major cause of cost overruns were identified: 1) market conditions, 2) personal experience in the contract work, 3) insufficient estimated time for construction items, 4) material fluctuation, and 4) political situations [8].

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