DESIGN AND IMPLEMENTATION OF A BUDGET ESTIMATION MODEL FOR OIL AND GAS INDUSTRY

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Abstract

In some countries, oil and gas industry accounts as a key factor that influencing the gross domestic product (GDP). Therefore, this industry has gained high attentions. Nevertheless, this industry is surrounded with high level of uncertainties especially regarding well explorations and cost estimates of drilling wells.
This work describes a framework toward building a model for budget estimations for drilling wells. The current approach that is utilized by most of the companies is only depending on one single scenario, which is known as the deterministic approaches .This approach is associated with high level of uncertainties regarding the estimates of time and cost for drilling a well. On the other hand, another method known as the probabilistic approaches is considering multiple scenarios that are based on the nature of the data.

The current method that was used by the company was producing one single value for the cost and time necessary to drill well. The six sigma DMAIC methodology was utilized to explain the uncertainties associated with the current estimates of drilling wells. The methodology utilized the historical data available for specific wells to understand the nature of the problem that was facing the company. An analysis was performed to cover all the possible factors that can cause variation in the cost and time associated with drilling wells. In addition the analysis utilized risk analysis and Monte Carlo simulation integrated with the statistical analysis of the historical data. Four different statistical models have been applied toward improving the current estimates. These models provided new estimates for the cost and time needed to drill wells. These new estimates were compared with the actual data in order to validate the performance of these models. This comparison was based on four indicators. The best results for the estimates obtained that the new estimates were able to predict the actual ones by 85% for the cost and by 75.5% for the duration.