Risk Response Selection in Construction Projects

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Abstract

Risk and its management is important for the success of the project, the risk management, which encompassed of planning, identification, analysis, and response has an important phase, which is risk response and it should not be undermined, as its success going to the projects the capability to overcome the uncertainty and thus an effective tool in project risk management, risk response used the collective information in the analysis stage and in order to take decision how to improve the possibility to complete the project within time, cost and performance. This stage work on preparing the response to the main risks and appoint the people who are responsible for each response. When it's needed risk response may be started in quantitative analysis stage and the repetition may be possible between the analysis and risk response stage. The aim of this research is to provide a methodology to make the plane for unexpected events and control uncertain situations and identify the reason for risk response failure and to respond to risk successfully by using the optimization method to select the best strategy. The methodology of this research divided into four parts, the first part main object is to find the projects whose risk response is failed, the second part includes the reasons for risk response Failure, the third part includes finding the most important risks generated from risk response that leads to increasing the cost of construction projects, the fourth part of the management system is selecting the optimal risk response strategy. An optimization model was used to select the optimal strategy to treat the risk by using Serval constraints such as the cost of the project, time of the project, Gravitational Search Algorithm and particle swarm used. The result of the risk response selection shows that The investment (contractor, bank) strategy shows a very good strategy as it saves the cost about 30%, while the Mitigate (pay for advances with interest 0. 1) Strategy show saving the cost 40% and giving land to contractors show saving the cost 40% finally the BIM strategy show saving the cost 25%. The risk response is an important part and should give a great attention and it must be used sophisticated method to select the optimal strategy, the two techniques both show high efficiency in selecting the strategy but Gravitational Search Algorithm show better performance.

Keywords: Risk Management; Risk Response; Particle Swarm; Gravitational Search Algorithm.

1. Introduction

The method that used to manage risks effectively has been considering the central arena of project management for a long time because projects are gradually exposed to high risks [1]. when the project complexity increase the impact of risks can be much higher [2].

The risks can be defined as an uncertain condition or event that its occurring has an influence on at least one of the objectives of the project. Objectives can involve scope, schedule, quality, and cost. The causes of risk may more than one, hence his occurring has more than one impacts. The requirement, constraint or assumption may be the cause that generates the outcome with possibility been negative or positive [3].