

Incentive Contracts in Project Management under Contractor's Process Improvement

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Abstract

Around 55% of businesses experience project failure at some point where the failure is usually blamed on culprits such as a bad idea, poor planning, overly aggressive timelines, or unforeseen changes and delays. This is mainly because of working in an uncertain environment, which leads to suboptimal results, where each side of a transaction tries to get a premium for the risk to which it is exposed. From a project management perspective, the contractor may exert less effort and may ask for higher reimbursement. This leads to less efficient economic performance and consequently less economic benefits to the project owner. In order to reduce future uncertainty, the project manager should offer a proper contract. For example, to reduce price uncertainty, the project manager and contractor may sign a fixed-price contract, whereas, when the product has to be developed, such as in R&D projects, and where there is uncertainty on the production side, the contractor faces additional uncertainty, hence the project manager may have to offer a cost plus incentive fee contract.

This paper aims to develop an effective contractual strategy to help the project manager increase its control and visibility over contractor's process. Specifically, we aim to answer the following research questions:

1. What are the main inefficiencies that the project manager faces with a contractor whose cost and the level of process improvement are privately known by the contractor?
2. What are the characteristics of an effective contractual strategy for the project manager to induce the optimal level of process improvement on its contractors?

To address the above research questions, we develop an incentive contract for the project manager when outsourcing to a risky contractor whose delivery outcome is subject to quality risk. To reduce the likelihood of failure, the contractor can invest in a costly process improvement effort, however, the cost of such an effort is private information for the contractor, which results in adverse selection problem. Moreover, the contractor's decision on process improvement is also unobservable to the project manager, which results in moral hazard problem. We first obtain the first-best solution, and then solve for the second-best optimal cost plus incentive fee (CPIF) contract under full information asymmetry. Our comparative study between the first- and second-best contracts enables us to characterize the efficiency loss due to underinvestment by the high-cost contractor and information rent extracted by the low-cost contractor.

Keywords

Project management, Contract design, Information asymmetry, Process improvement

Biography

Mahsa Madani Hosseini is a lecturer in the Ted Rogers School of Management, Ryerson University, Toronto, Canada. She received her Ph.D. in Civil and Environmental Engineering with minor in Statistics from Concordia University. She also holds Project Management for Technical Professional Certificate at Ryerson University. In her research, she is interested in applying data analytics and statistical methods to focus on the intersection of health and environment.