An Optimal stopping model for the control of an R&D investment Project with uncertain completion Time and Partial Salvage Value1

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Abstract:

We consider an optimal stopping model which generalizes the model that have studied by Tailan Chi,John Liu and Hong Chen in IEEE TRANSACTIONS ON ENGINERING MANAGEMENNT, vol.44,No1.pp.54-66.1997. The model involves an optimal stopping decisions for the control of an investment project that takes an uncertain length of time to develop and can still provide a partial payoff even if it is terminated without achieving its original performance objectives. An important limitation of the model presented by Tailan Chi et al. is the implicit assumption that the applicable discount rate is zero. In the paper, we explore the implications for the optimal stopping rule of relaxing this restrictive and unrealistic assumption. We first investigated the solution of the model under a specific set of assumptions about the forms of the functions that characterize the uncertainty about the project and the buildup of its value. An analytical solution was derived for the general case where the discount rat is allowed to be positive .In particular, when the discount rat is zero. Our deduced results are consistent with that of Tailan Chi et al. Using the insights from the solution under the specific set of assumptions, We then examined the solution of the model under alternative assumptions about those component functions. Finally, Our results suggest that the optimal control policy is quite sensitive to show the terminal pay off evolves in a project's development process and the discount rate, pointing to the importance of carefully accounting for their impact in determining the control policy for this kind of project.

Keyword: Capital budgeting, dynamic programming, stochastic control, optimal stopping, project management, salvage value, uncertainty.
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