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Information acquisition and optimal project management

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Abstract

This paper provides a rationale for why an organization often generates a bias in favor of a new project even after learning that its profitability will be certainly below more conventional ones. We analyze a principal–agent model with two alternative projects, one of which is to be chosen by the principal. In our model, the profitability of a project is determined by the cost of implementation. All parties are familiar with one of the projects (the known project), and thus the implementation cost of this project is common knowledge. Information on the other project (the new project), however, must be acquired by the agent. We find that the new project may be chosen in the optimal contract even when it turns out to be more costly to implement than the known project, if acquiring information is costly enough and the realized implementation cost of the new project is below a particular level. We also discuss distortion in the new project's output schedule when it is selected.

JEL classification: D82; L23

Keywords: Information acquisition; Principal–agent; Project management

1. Introduction

Project management occupies an important place in organizations. The top management within an organization often sets a policy on how projects are to be selected and implemented, and the projects are managed based on their direct and indirect contributions. One major difficulty in project management, as Cyert and March (1961) note, stems from the fact that organizations usually face a choice of alternative projects within a given sector. A new project that operates differently from the conventional ones may add to the cost of implementation, and practitioners point out that a frequent question in the process of project management is, "Why don't we just do it the old way?"[1]

Organizations sometimes hold onto a new project even after it turns out to be more costly to implement, thus less profitable than other alternatives. As Royer (2003) reports in Harvard Business Review, Esslier, a corrective lens supplier for eyeglasses, introduced a different material for its lenses in 1982 and manufactured the new lenses for nearly a decade even though production cost of the new lenses turned out to be much higher than the normal lenses. Similarly, in 1964 Sony Corporation launched its television sets with Chromatron tubes instead of the traditional shadow mask CRTs. Prior to manufacturing its new product, the development team warned that the assembly of the

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[1] For example, see Cook and Tate (2005, p. 16).

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Chromatron would be much more complex for mass-production compared to the shadow mask. Despite its significantly higher manufacturing cost, the company chose to install Chromatron tubes for its television sets and stubbornly mass-produced them until 1968.[2] Although there are a number of psychological explanations for these phenomena,[3] few economic studies provide a rationale for why an organization generates a "bias" in favor of a new project even after learning that its profitability will be certainly below more conventional ones.

Using a principal–agent model, we attempt to see why and under what circumstances a new project is favored by the principal, even after its profitability turns out to be lower than alternatives, as well as how distortion is generated in the outcome of such project. An innovative project usually involves gathering information, which is often uncontractible. Thus, organizations may necessitate an indirect way to provide incentives for information acquisition. As demonstrated in the studies by Lewis and Sappington (1993, 1997), when the principal cannot tell whether or not the agent is informed, distortion in the output schedule becomes larger compared to the case in which the agent is always privately informed. When the agent's private information is useful to the principal's decision making, the principal may want the agent to be informed even though the agent can command information rent. Moreover, when the agent must expend resources to be informed, the principal must deal with problems associated with both hidden action (information acquisition) and hidden information (truthful report of the acquired information). That is, the agent has an incentive to save the cost of information acquisition, and once information is acquired, he has an incentive to manipulate it to reap information rent.

In our model, there are two alternative projects, one of which the principal will select. A project's profitability is determined by the cost of its implementation. Both the principal and the agent have experienced one of the projects (the known project), and hence the implementation cost of this project is public knowledge. The other project, however, employs a new technology (the new project) and neither the principal nor the agent knows its implementation cost. By gathering information, however, the agent can be privately informed of the new project's implementation cost, while the principal remains uninformed and must rely on the agent's report. Thus, the contract offered by the principal is contingent on the agent's report about the new project's implementation cost and specifies the project to be implemented, the selected project's output level, and the transfer to the agent.

Our analysis reveals that the new project, even when it turns out to be more costly to implement than the known one, can be selected if the cost of the new project is below the expected level. Since information acquisition is a hidden action in our model, when the agent reports the new project's implementation cost, the principal cannot tell whether the agent in fact acquired the information or the agent is reporting it without being informed. Therefore, direct compensation for the information gathering cost, no matter how much the principal pays, cannot induce the agent to acquire information — the only way to induce information acquisition is to make the agent benefit from it. Since the agent obtains information rent only when the new project is selected (the implementation cost of the known project is public knowledge), the principal generates distortions not only in the output schedule for the new project, but also in selecting the project.

Compared to the case where information acquisition is not a problem, the principal decreases the scope of selecting the new project for the range of implementation cost higher than the expected level, but increases the scope of selecting the new project for the cost range lower than the expected level. The reason is as follows. Due to the truth-telling mechanism, if not informed, the agent will report that the new project's implementation cost is at the expected level.[4] To discourage the agent from reporting the new project's cost without being informed, the principal reduces the agent's rent when the agent reports that the cost is at the expected level. In doing so, the principal must also reduce the agent's rent for the entire range of the new project's implementation cost that is higher than the expected level. This is because the principal must also prevent the agent from exaggerating the implementation cost once he is informed of it. As a result, the region of selecting the new project is decreased for the range of the cost that is higher than the expected level. However, to make the agent benefit from information acquisition, the overall expected rent to the agent must be increased. Thus, for

[2] See Lyons (1976).

[3] See, for example, Brockner (1992). The authors argue that organizations are reluctant to admit that their new project is flop, and this type of behavior sometimes escalates to the point at which the unsuccessful project is continued to be supported. See also Statman and Caldwell (1987) and Shefrin (2001).

[4] Reporting "the expected level" by the uninformed agent is due to his risk-neutrality in our model. The implementation cost reported by an uninformed risk-averse agent will be higher than the expected level.