

Chapter 71

Knowledge Management and Quality Control in Software Outsourcing Projects

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ABSTRACT

This article describes how entrepreneurs face critical risks in terms of quality control and knowledge management while outsourcing software development to independent service providers. First, it is recommended that lump-sum payment contracts should be avoided since software development project involves uncertainty. Instead, a variable payment contingent on observed quality can induce the service provider to exert optimal effort on the project. Second, entrepreneurs must not overlook the importance of providing economic incentives. They can protect their intellectual property by withholding critical knowledge and paying information rents in terms of higher than market wages to the service providers. Third, a startling result is that a low wage nation is not necessarily the optimal location to outsource software development projects. Thus, high wage-strong IPR nations might be chosen instead of low wage-weak IPR nations. Finally, the article explains the apparent paradox that software projects are often outsourced to locations that are characterized by weak intellectual property rights regime and high propensity of imitation.

INTRODUCTION

Traditionally, profit seeking business organizations have outsourced non-core production activities like manufacturing outside their own boundaries. Until recently, firm specific core activities were looked upon as sacrosanct areas which firms preferred to keep in-house. However, in the spate of increased competition and tight budget constraints, perceptions are changing and companies are looking to outsource even their core activities. Evidently, outsourcing of specialized services like software development, R&D has become prominent in business supply chains. Software development is a human and knowledge intensive activity (Birk et al., 1999) involving collaboration between several entities. For instance, entrepreneurial

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software firms are found to outsource development tasks to contract agents; the pharmaceutical industry is extensively outsourcing R&D to independent contract research organizations. More recently, companies are increasingly following the trend of adopting mobile-first and mobile-only strategy. Consequently, mobile application (“app”) development industry is a burgeoning area where entrepreneurs are contemplating whether or not to outsource the app development tasks to independent, specialized contractors.

In contrast to manufacturing outsourcing, where client firms might have an established line of product, software development outsourcing is quite different in terms of the risk factors involved. An entrepreneurial start-up may not have an established product. Instead, it is the idea and intellectual property (IP) that plays most important role for software companies. If idea and critical business sensitive knowledge is misappropriated then there is hardly anything that can be done except resorting to time consuming, costly legal proceedings. In the software industry there is severe competition and first mover advantage plays a vital role. Thus, entrepreneurs need to take vital decisions while deciding to outsource the development service to independent contractors. In order to save resources like time and money, entrepreneurial software start-up firms are resorting to outsourcing of software application development service. While doing so, the entrepreneurs face the following practical problems.

It is being observed that several firms are outsourcing software development projects to geographic locations where wages are low but IPR protection is weak and may have prevalent culture of copying client’s technologies. For instance, software piracy rate in China is 74% and that in India is 60% which incidentally are the most sought-after IT outsourcing destinations (U.S. Chamber of Commerce, 2016). In contrast, another set of firms choose to outsource their project to locations that are characterized by higher wage yet strong IPR regimes. This creates a puzzle for software entrepreneurial firms while deciding the location of outsourcing their project. Specifically, these firms face a trade-off between wages and IPR regimes. In addition to the problem related to choice of location, firms also face two critical risk factors (agency problems) associated with service outsourcing.

First, the entrepreneur loses control over the software development task being outsourced. This is one of the major issues faced by entrepreneurs while deciding whether or not they should go for outsourcing of development tasks. Since the entrepreneur (client) is outsourcing the development to independent developers; he/she cannot directly control and monitor the activities of the service provider (developer). If not being monitored, there is possibility that the developer might exert less than optimal effort on the outsourcing project. Depending on the task being outsourced, this can lead to severe adverse impact for the client. For instance, if a developer engages in shirking and exerts suboptimal effort on the outsourced project, then the software would not meet the envisaged specification requirements. This could lead to severe quality control problem for the client firm. In a highly competitive market like that of software app market, if the client ends up with an app with less than desirable quality, then it would be impossible to cater to the target audience. Thus, it is critically important for the client to devise certain mechanism that would ensure that the developer exerts desired optimal effort on the outsourced project to meet the functionality specifications.

Knowledge management (KM) and confidentiality is the second major problem that entrepreneurs face when they decide to outsource development tasks to independent service providers. Software companies routinely share their proprietary IP like source codes for testing and debugging and sensitive systems designs for applications development with their contractors. By doing so, these firms expose themselves to the risk of losing their IP. The developer might use the proprietary software of the customer to build a rival product. Likewise, in the context of cloud computing, client firms may lose control over their proprietary data and applications that are located with the provider (Sen, 2013). Cloud operators might

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