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MULTITASKING AND INCENTIVES IN APPLICATION SERVICE PROVIDER CONTRACTS FOR CUSTOMER RELATIONSHIP MANAGEMENT

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Abstract

The discussions in the literature on contracting mostly refer to situations where the agent has to perform a single task. The standard incentive predictions do not hold when there are multiple tasks to be undertaken by the agent and there is interaction between tasks. The link between incentives and contracting can be understood by an exploration into the complementarity of the tasks and the nature of contract. In our research we develop a theoretical framework that can be tested empirically to establish that when the different tasks are complementary, optimal incentives in the contract should be low-powered.

Introduction: Hosting CRM Applications

The emergence of ASPs, which provide information technology (IT) application services over the Internet to companies on a usage basis, offers a strategic IT outsourcing option. For organizations this will entail lower up-front costs than installing a system themselves or hiring consultants to do so; also this requires very little investment in people and time from the already beleaguered corporate IT departments. The ASP model potentially offers a much more rapid installation of needed software capabilities since mission critical IT capabilities are delivered almost off the shelf. However, for proven performance in the ASP business model it is not enough if the ASP merely provides the requisite quality of service through service level agreements (SLA) provisions and ensures good application response time. It is also necessary for the ASP to invest in software management capabilities to provide needed IT solutions (Landgrave, 2002) to their customers.

The IS literature posits that viability and profitability of outsourcing relationships depend crucially on the efficacy of contractual arrangements both parties agree to at the outset (Lacity and Willcocks, 1998; Lacity et al, 1995). Our research looks at the provision of incentives for ASPs hosting customer relationship management (CRM) solutions in the contracts drawn up between the ASP and the end user organization. For an effective CRM campaign, it is important to have real time communication with customers, ensure adequate search and retrieval technologies, dynamically profiling consumers' preferences, and ensure rapid response to customer queries and complaints. An ASP offering a CRM hosting solution should provide network infrastructure to support interactive, real-time customer interaction handling that enables multi-media communication with customers. At the same time the ASP should also offer software capabilities such as support for user profiling and personalization that will provide a customer the same experience, no matter how, when or where that individual accesses the company's e-business operations. ASPs face multiple tasks in that they have to ensure a reliable network infrastructure as well as deliver software capabilities; these tasks can be highly complementary for customer relationship management applications. This would contrast with ASPs offering applications such as web hosting applications, which are not heavily application dependent, or functional applications such as accounting, where the software and network infrastructure are less complementary. Using a multitask agency framework, we characterize the optimal contract between ASPs and end user organizations focusing on the best incentives in the contract design and develop a theoretical model that will be analyzed empirically using data on ASP contracts.

A Conceptual Framework of Multitasking

Since there is more than one kind of effort or "task" that the ASP has to execute in order to provide IT solutions to clients, our research introduces a multi-task principal agent model into the application service provider framework. Contract theorists of moral hazard (Mirrlees 1999, Holmstrom 1979, Grossman and Hart 1983) posit that there should be appropriate design of incentive schemes for an agent who works for a principal but has private information on his effort level. The principal cannot directly observe the effort undertaken by the agent and can only observe an imperfect indicator such as output. Moral hazard theory distinguishes between high-powered and low-powered incentives; high-powered incentives refer to compensation based on output and other schemes where the structure of the contract offers strong incentives for the agent to exert optimal performance. Procurement literature has emphasized the importance of high-powered incentives in contracts (Laffont and Tirole, 1993) whereby the optimal contract offers high performance incentives for the service provider to exert effort so that the lowest cost is realized. The optimal contract should therefore provide incentives for the agent, here the ASP, to put in higher amounts of work since greater effort increases the probability of achieving higher output levels.

In the case of ASP contracts, the end user organization does not know what is the minimum cost for the ASP's service. When a firm and the ASP have perfect information about the technology and the firm's requirements of IT services are fully known upfront, standard moral hazard theory predicts that it is optimal to offer a fixed price contract to an ASP (Grossman and Hart, 1983). The fixed price should be set at the lowest level consistent with the ASP's participation provided the ASP chooses the cost minimizing effort (Grossman and Hart, 1983; Holmstrom, 1979); thus a fixed price contract is the high powered incentive contract that makes the ASP the residual claimant of cost saving effort that it can exert. Compensating the ASP based on costs incurred is a low-powered incentive scheme whereby the ASP does not have any incentive to exert effort to reduce costs for the end users.

Earlier IS literature has discussed incentive issues underlying the design of contracts (Whang, 1992; Richmond, Seidmann and Whinston, 1992; Richmond and Seidmann, 1996; Wang, Barron and Seidmann, 1997, Fumas and Whinston, 1976); however a crucial difference in the ASP context is that the ASP typically performs multiple services similar to the multitask agency literature (e.g. Holmstrom and Milgrom 1991), where the agent performs several different tasks for the same principal. The different tasks are substitutable in the agent's effort supply function; when there is complementarity between tasks the principal needs to provide incentives to the agent to exert effort along several dimensions rather than provide incentives that will encourage the agent to concentrate only on one task (Holmstrom and Milgrom, 1991; Slade, 1996; Hubbard, 1998). With high-powered incentives, the ASP might shift effort from tasks that are crucial to the CRM application but not readily reflected in the performance measure, such as network availability. Thus, the multitask agency literature suggests that optimal incentives should be 'low powered,' thus compensating the ASP based on costs incurred ensures that there is no distortion in the ASP's effort function.

With reference to the ASP service model, ASPs hosting customer relationship management solutions face highly complementary tasks. Theoretical discussions of complementarity (Topkis 1978) posit that increasing returns to an activity raises the returns to the complementary activity. For instance, Milgrom and Roberts (1990) argue that manufacturing firms that adopt flexible technologies also adopt new product strategies. The literature on multitasking shows that when a worker faces a multi-dimensional choice of effort, the optimal incentive system should ensure that there is no distortion in the worker's effort, i.e. high incentives on one task that will make the worker neglect the other task. Individual level output based measures are difficult to implement when the effort has to be cumulative (Holmstrom, 1982), and there are interactions between efforts on different activities. Therefore rewarding ASP based on observable signals such as application response time may not be optimal for the firm. If the ASP is rewarded based on networking performance, it will induce a distortion on the ASP's effort levels with respect to enhancing the quality of its software solution, and vice versa. Our analysis will be a first step in quantifying the importance of aligning the incentives for multiple tasks in application hosting, especially with reference to software for customer relationship management hosting. We argue that the contracting needs to ensure right incentives if the ASP needs to deliver economic value to adopters.

Analysis of the Multitask Problem

Our central hypothesis is that the two task structures – network performance to ensure rapid application response and resource availability and software functionality that delivers improved IT capabilities offered by the software – are complements for ASPs providing customer relationship management solutions. Our theoretical model aims to analyze these effects drawing upon theoretical discussions of complementarity (Athey and Stern 1998, Holmstrom and Milgrom 1994). When several activities compete for the ASP's attention, the levels of incentives provided for different activities that an ASP performs should be complementary in the incentive problem. The intuitive idea is that increasing the incentives for one task would cause the ASP to devote too much attention to that task and neglect the other tasks. Our research attempts to empirically explore the optimal

contract form as a balance of incentives between network performance and reliability and software capabilities in application software provider contracts.

Complementary relationships between different incentive variables can be identified by their conditional variation, after controlling for exogenous factors that determine the level of intensity of incentives. We also propose to conduct statistical tests that can establish affiliation between incentive structures, which in turn can be used to make comparative static predictions between the need for efficient quality of service and improved functional capabilities offered by the ASP solution. To ensure that there is no bias in selection, we removed hosting of email from our sample. A hosted messaging bundle, for example, needs multidimensional effort by the ASP since the ASP provides both email applications via a messaging server, as well as IT capabilities for deploying the application.

In testing the implications of complementary efforts on the incentives for ASPs, we cannot directly test for the effects of complementarity since we do not have available measures for the value of different activities, for example networking and software services, on the overall solution delivered by the ASP. Thus our research is designed to test an important implication of complementarity, that there are interaction effects between the two parameters, networking and software provision. Prior studies of complementarity have validated complementarity by testing for correlation between key parameters (Arora and Gambardella 1990, Cockburn et. al 1999). This procedure suffers from the problem that two parameters say x and y , are positively correlated because they are in turn strongly correlated with another characteristic of the contracting process. Therefore we rely on testing for a property termed affiliation, which is a stronger form of complementarity. When two variables are affiliated, large values of a variable make it likely that the affiliated variable is also larger rather than smaller Milgrom and Weber(1982). For multitasking ASP contracts, this implies that we test for the prediction that a higher importance on networking dimensions also necessitate higher importance on the software capability dimensions. Our empirical specification therefore relies on testing for affiliation rather than correlation whereby we test for covariance in conditional expectation of the parameters, rather than covariance in the parameters themselves. Our research will establish measurable parameters to assess the importance to the two dimensions, which can be followed up by an empirical study to interpret the economic theories of incentive provision in a computing context.

In our analysis we develop a characterization of ASP contracts for CRM using insights from multitask frameworks in incentive based theories of the firm (Holmstrom and Milgrom 1994), agrarian contracts (Akerberg and Botticini, 2001), and contractual forms in retailing (Slade 1996). Our empirical analysis intends to assess the complementarity between the networking dimensions of the ASP solution with that of the software capabilities needed in the case of contracts for CRM and relate our findings to the incentives in the contract.

Summary of Proposed Research Design

We propose to analyze data from application service provider contracts for IT services. We intend to explore the link between incentives and the nature of IT tasks performed by the ASP as described below.

- The discussions in the literature on contracting mostly refer to situations where the agent has to perform a single task. The standard incentive predictions do not hold when there are multiple tasks to be undertaken by the agent and there is interaction between tasks.
- ASPs hosting CRM applications face a set of highly complementary tasks unlike other ASPs who face multiple tasks that are not complementary .
- The link between incentives and contracting can be understood by an exploration into the complementarity of the computing resources and the nature of contract.
- Our empirical analysis establishes that the different tasks in CRM provision are indeed complementary; we then establish that when the tasks are complementary, the contracts are low-powered.

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