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ABSTRACT

Information Systems literature emphasizes the importance of efficient contracts for managing outsourcing relationships. However, there is a lack of proven and tested contract designs in theory as well as in practice**.** With the help of Economic Theory we analyze the underlying dynamics of an outsourcing relationship. Based on mathematical Principal-Agent-Theory we aim at answering the following questions: (1) 'what are the characteristics of an 'optimal' outsourcing contract?' and (2) 'how can the Outsourcer contractually implement incentives for the Service Provider?'. Our theoretical findings stress that within an 'optimal' contract the marginal utilities of both parties involved have to be proportional. For practical implications this means that an increase of the Service Provider's profit has to be accompanied by a decrease in the Outsourcer's costs. To accomplish this we show how incentives can contractually be implemented as suggested by Principal-Agent-Theory. We test our findings based on a single case study research.

Keywords

Principal-Agent-Theory, Outsourcing Relationship, Contract

INTRODUCTION

The examination of outsourcing — the purchase of a good or service that was previously provided internally (Lacity and Hirschheim, 1993) — has been a domain of Information Systems (IS) research for several years now. Within an outsourcing relationship the contract is an important tool to attain the expected benefits. The importance of a contract as one of several key success factors within an outsourcing relationship has been stressed by various researchers (e.g. Kern (1997) and Useem and Harder (2000)). However, there is a lack of research on the choice and design of contract mechanisms (Aubert, Houde, Patry and Rivard, 2003). Based on Economic Theory we aim at analyzing the prerequisites of an 'optimal' contract. Therefore, we combine insights derived from Principal-Agent-Theory to IS research on outsourcing relationships.

Within IS literature Principal-Agent-Theory is mentioned as an appropriate tool to analyze problems between two parties due to the asymmetric distribution of information (Loh, 1994). However, most principal-agent-related research on IS contracts comprises only a 'verbal' discussion of the positive problem. Our research focuses on normative (mathematical) analysis. Our goal is to identify characteristics of an 'optimal' contract (in the sense of pareto-efficiency) which incorporates true sharing of risk and return. We also demonstrate how respective incentive mechanisms can be implemented.

Based on the Outsourcer's perspective, we therefore aim at answering the following research questions:

- What are the characteristics of an 'optimal' outsourcing contract?
- How can the Outsourcer contractually implement incentives for the Service Provider?

To approach these research questions we first provide a brief overview of the Principal-Agent-Problem as a research framework (section 2). Then, section 3 focuses on the formal derivation of the Principal-Agent-Problem. We introduce the so-called first and second best solution. Within the course of this paper we relate our theoretical findings to an example of the outsourcing of IT-Infrastructure-Services. Section 4 analyzes these results and suggests implications for practical outsourcing contracts. In section 5, we empirically test our findings with the help of case study analysis. Section 6 points to the limitations of this research and highlights the main contributions.

RESEARCH FRAMEWORK: INTRODUCTION TO PRINCIPAL-AGENT-THEORY

Within Economic Theory, the main focus of Principal-Agent-Theory is to explain how to design a contractual relationship which employs information asymmetry in an efficient way (Dibbern, 2003). In most contractual relationships the parties involved do not have perfectly congruent goals and therefore a contract is developed to detail their relationship (Eisenhardt, 1989a). Ross (1973) first introduced the canonical Principal-Agent-Problem. An Agency-Problem can be defined as a contract under which a principal engages another person — the agent — to perform a service on their behalf. This involves delegating some decision-making authority to the agent. This is, for example, true for an Outsourcer (principal) who purchases services from a Service Provider (agent).

If both parties are utility maximizers it can be assumed that the agent will not always act in the best interest of the principal. The source of moral hazard is an asymmetry of information among individuals that results in the fact that individual actions cannot be observed and hence contracted upon (Holmström, 1979). The principal can limit divergences from their interest by establishing appropriate incentives for the agent. Furthermore, monitoring can help to limit the diverging activities. Therefore, many phenomena within contractual relationships such as asymmetric information between a principal and an agent and as a consequence thereof the existence of agency conflicts can be explained by considerations of the Principal-Agent-Theory (Jensen and Meckling, 1976; Ross, 1973).

Agency-Theory has developed along two lines: positive and normative Agency-Theory (Eisenhardt, 1989a). Positive Agency-Theory is more concerned with a verbal description of Principal-Agent-Relationships and the analysis of methods used to set-up and monitor contracts (Demsetz, 1999). In comparison with the positivist strand normative Agency-Theory is abstract and mathematical (Dibbern, 2003; Eisenhardt, 1989a). A detailed understanding of the underlying mathematical assumptions is therefore necessary to 'verbally' analyze the Principal-Agent-Problem and to determine possible solutions. The following research is based on normative Agency-Theory.

FORMAL DERIVATION OF THE PRINCIPAL-AGENT-PROBLEM

In this section we develop the Principal-Agent-Problem in situations of moral hazard. We show how the optimal sharing rule can be formally derived. This approach is based on research conducted by Harris and Raviv (1978), Holmström (1979) and Ross (1973). In the next section the common underlying assumptions are introduced. Then, the basic first and second best optima are presented. The 'first best optimum' comprehends the case of symmetrically distributed (i.e. perfect) information. The expression 'second best optimum' refers to asymmetrically distributed information. These expressions are notions taken from the Principal-Agent-Theory. Finally, the so-called Likelihood-Ratio is introduced. The result of this section — namely the optimal sharing rule — builds the foundation for our analysis introduced in the subsequent section.

Assumptions

In the following the outsourcing of IT-Infrastructure-Services is being analyzed as a Principal-Agent-Problem, with the Outsourcer (ð principal) desiring some services to be performed. They assign this work to a Service Provider (ð agent) due to specialized expertise on the part of the agent. We take up the standard Principal-Agent-Model assumptions, namely (1) goal incongruence and (2) information asymmetries.

In the Principal-Agent-Relationship the Service Provider privately takes an action $a \in A$, with A as the set of all possible actions. a is a productive input with direct disutility for the Service Provider. This creates an inherent difference in objectives between both parties. In our example, the Service Provider can choose different levels of effort (i.e. regarding time and quality). The Service Provider's effort a cannot be perfectly observed by the Outsourcer without incurring prohibitive monitoring costs. Within their relationship the Outsourcer and the Service Provider agree upon an outcome x to be determined by compliance with the agreed upon contract (i.e. delivery of the defined IT-Infrastructure). This outcome x depends not only on effort a but also on the random state of nature θ ($\theta \in \Omega$ the state space set), such that $x = x(a\theta)$. This means that outcome x is determined by the Service Provider's decisions and actions concerning the means of fulfilling the requested service as well as by the random state of nature θ (e.g. electrical power outage, etc.). The share of x that goes to the Service Provider is denoted by $s(x)$, with $s(x) < x$ and $s(x) \geq 0$. In our example of IT-Infrastructure-Services this share can be understood as a fee payable to the Service Provider. Accordingly, $x - s(x)$ is the share that goes to the Outsourcer representing the Outsourcer's profit. The challenge is to determine an incentive compatible contract that incites the Service Provider to 'do their best' when providing the service.

It is assumed that both the Outsourcer and the Service Provider hold state independent von-Neumann-Morgenstern-Utility-Functions, $G(x)$ and $H(x,a)$. They act as to maximize their expected utility. In reality, companies do not base their business on utility functions but on cost and profit calculations. Therefore, the Outsourcer's utility can, for example, be understood as a decrease of costs as this is often an objective pursued by outsourcing (Lacity and Willcocks, 1998). The Service Provider's utility can, for example, be interpreted as a profit increase implying that the compensation they receive is larger than their input for providing the IT-Infrastructure-Service. This is reflected in the model by assuming that

$H(x,a) = U(s(x)) - V(a)$ with $V' > 0$ and $x_a \geq 0$. This means that the Service Provider's utility function $H(x,a)$ is defined by the payoff with respect to the action a. It is denoted by the difference between the payment from the Outsourcer $U(s(x))$ and their own cost for the related action $V(a)$. The constraints regarding V' and x_a ensure that the Service Provider minimize their costs for the related action and that they receive a payoff $x \geq 0$.

It is assumed that the Service Provider is risk-averse leading to $U'' < 0$. The Outsourcer may be or may not be risk-neutral, i.e. $G'' \leq 0$. The Outsourcer observes only x and not a. x can be seen as a signal for the unobserved action a. Therefore, the sharing rule has to be a function of x alone.

Summing up it is assumed that $H(x,a) = U(s(x)) - V(a)$ is valid under the following conditions: (i) $V' > 0, V'' > 0$ considering the Service Provider's objective to minimize costs, (ii) $U' > 0, U'' < 0$ considering the Outsourcer's objective to maximize payoff, (iii) $G' > 0, G'' \leq 0$ considering the Outsourcer's risk-neutrality or non-risk-neutrality, (iv) $x_a \geq 0$ considering the dependency of the payoff on action a.

Generic Formal Model

The basic model assumes that the Outsourcer observes only the outcomes they receive from the Service Provider. The Outsourcer is not able to observe action $\hat{a}$ actually taken by the Service Provider. Therefore, the sharing rule has to be defined by x alone. The output x is understood as a signal for the action which is not directly observed. Both parties have the same information about the probability distribution. Therefore, it is assumed that the Outsourcer and the Service Provider agree on a probability distribution of θ. Before θ is known, the Service Provider chooses a.

The pareto-optimal sharing rule $s(x)$ is generated by the following model:

$\max\limits_{s(x)} \{G(x - s(x))\}$	Outsourcer's objective	(1) subject to
$H(s(x),a) \geq \overline{H}$	Participation constraint	(2)
$a \in \arg\max\limits_{\hat{a} \in A} \{H(s(x)), \hat{a}\}$	Incentive constraint	(3)

Constraint (1) describes the Outsourcer's objective of maximizing their utility depending on their payoff, i.e. the difference of outcome x and the share that goes to the Service Provider $s(x)$. The participation constraint (2) guarantees the Service Provider a minimum of expected utility $\overline{H}, with\ 0 \leq \overline{H} \leq H(x,a)$. The incentive constraint (3) reflects the restriction that the Outsourcer is not able to observe the action $\hat{a}$ actually chosen by the Service Provider. The notion 'arg max' denotes the set of arguments that maximize the objective function that follows.

First and Second Best Solution

Usually, the random state of nature θ is disregarded in Principal-Agent-Models. The outcome x is parameterized with the variable a. Therefore – in the continuous case – the density function $f(x,a)$ can be derived with its partial derivations f_a and f_{aa} defined for all (x,a) (Jewitt, 1988).

The sharing rule of $s(x)$ can now be generated by the following model (Holmström, 1979):

$\max \int_{x-}^{x+} G(x - s(x)) f(x,a) dx$	Outsourcer's objective	(4)
$\int_{x-}^{x+} [U(s(x)) - V(a)] f(x,a) dx \geq \overline{H}$	Participation constraint	(5)
$\int_{x-}^{x+} U(s(x)) f_a(x,a) dx = V'(a)$	Incentive constraint	(6)

First-Best-Solution

Determining the first-best-optimum is based on a kind of a 'thought experiment': it is assumed that all information is distributed symmetrically between the two parties involved. This means that the Outsourcer is able to observe all actions taken by the Service Provider at no cost. They are therefore also able to determine whether or not the Service Provider behaves in their interest. The Outsourcer defines a contract that maximizes their own expected utility considering a minimum expected utility for the Service Provider. The optimal contract under symmetric information can be determined by optimizing the Outsourcer's objective (4) and the participation constraint (5). Within symmetrically distributed information the incentive constraint (6) has to be disregarded as the action chosen by the Service Provider is directly observable for the Outsourcer. With the help of a Lagrangian optimization, the following result can be derived.

$$\frac{G'(x-s(x))}{U'(s(x))}=\lambda$$ Optimal contract under symmetric information (7)

Equation (7) represents the first-best-solution implying 'optimal' (i.e. pareto-efficient) sharing. This 'optimal' sharing rule under symmetric information is defined by the ratio of the first derivative of the Outsourcer's utility function G' and the first derivative of the Outsourcer's payment to the Service Provider U'. It can be concluded that within the first-best-solution the marginal utilities of both parties involved have to be proportional to each other to arrive at an 'optimal', compatible contract. With respect to the outsourcing example, this means that the decrease in costs for the Outsourcer has to be proportional to the Service Provider's profit increase.

Second-Best-Solution

If information between the Outsourcer and the Service Provider is distributed asymmetrically then only the second-best-solution can be realized. This means that the Outsourcer is not able to observe any actions taken by the Service Provider. They cannot determine whether or not the Service Provider behaves in their interest.

Therefore, an incentive constraint (6) is being introduced. This constraint should provide the Service Provider with an incentive to choose an action that is in the best interest of the Outsourcer. The necessary participation (5) and incentive (6) constraint are induced by partial differentiation of the Lagrange Function (8).

$$L=\int_{x-}^{x+}G(x-s(x))\,f(x,a)dx+\lambda\left[\int_{x-}^{x+}U(s(x))\,f(x,a)dx-V(a)\right]+\mu\left[\int_{x-}^{x+}U(s(x))\,f_{(a)}(x,a)dx-V'_{(a)}(a)\right]$$

Lagrangian optimization (8)

If the Lagrangian yields are optimized pointwise the 'optimal' sharing rule can be denoted as follows:

$$\frac{G'(x-s(x))}{U'(s(x))}=\lambda+\mu\,\frac{f_a(x,a)}{f(x,a)}$$ Optimal sharing rule (9)

In (9) an optimal contract is implicitly being defined. It is assumed that both sides of equation (9) only adopt positive values. The ratio of marginal utilities ensures a 'fair' sharing of risk and reward. As for practical implications, this means that an increase of the Service Provider's profit (e.g. based on economies of scale or scope) has to be accompanied by a decrease in the Outsourcer's costs. In turn, if the profit of the Service Provider sinks, they may increase the fees payable by the Outsourcer.

λ is the Lagrange-multiplier for the participation constraint and μ is the Lagrange-multiplier for the incentive constraint. Both, λ and μ are constant for all possible solutions. Therefore, as (9) shows the fee payable to the Service Provider does not solely depend on the relationship of the marginal utilities but also on the quotient $\frac{f_a(x,a)}{f(x,a)}$. This ratio is called Likelihood-Ratio and plays a key role in determining the respective fee. It is therefore presented in further detail in the following section.

Likelihood-Ratio

Mirrlees (1976) assumes a dependency of the probability and density function regarding action a which can be described by $f(x) = f(x|a)$. This assumption reflects a first order stochastical dominance, which means that high effort being made by the Service Provider makes higher results more probable. If the Service Provider increase their effort, the density for a determined result changes according to $f_a = f(x|a)$. The quotient $\frac{f_a(x,a)}{f(x,a)}$ is called Likelihood-Ratio. This ratio refers to output x and determines when this output can be used as a 'sound' signal for the effort regarding a taken by the Service Provider.

To explain the relevance of this ratio in further detail, we disregard the continuous case for a moment and focus on the discrete case where only two actions are distinguished. We assume that the Service Provider can choose between a high a_H and a low a_L effort level with $a_H > a_L$. The respective output levels created by these effort levels are x_H and x_L with $x_H > x_L$.

A Likelihood-Ratio is given if: $x_H(a_H)x_L(a_L) - x_H(a_L)x_L(a_H) > 0$ respectively $\frac{x_H(a_H)}{x_L(a_H)} > \frac{x_H(a_L)}{x_L(a_L)}$. Within that equation $x_H(a_H)$ is the short form of $x(q = q_H | a_H)$. The Likelihood-Ratio therefore indicates that a high output x_H is more likely to be derived from a high effort a_H than from a low effort a_L. Therefore, $\frac{\partial(x_i(a_H)/x_i(a_L))}{\partial i} > 0$. According to Bayes' Theorem the likelihood that an observed output x_i is derived from a high effort a_H can be determined as follows:

$$x(a_H | q_i) = \frac{x(a_H)\,x(q_i | a_H)}{x(a_H)\,x(q_i | a_H) + x(a_L)\,x(q_i | a_L)} = \frac{1}{1 + \frac{x(a_L)}{x(a_H)}\frac{x_i(a_L)}{x_i(a_H)}}.$$

If the Likelihood-Ratio is applied, then $\frac{\partial(x_i(a_L)/x_i(a_H))}{\partial i} < 0$. The denominator decreases in x_i. As a consequence $\partial x(a_H | q_i)/\partial_i$ increases. The higher the observed output x_i, the higher the probability that it was realized by a high effort a_H.

If the Likelihood-Ratio is used, the output can be interpreted as a 'sound' signal for the effort taken by the Service Provider. Therefore, it can be used as a basis for an incentive-scheme within an optimal contract.

IMPACTS FOR OUTSOURCING RELATIONSHIPS DERIVED FROM AGENCY-THEORY

The previous section presented the formal deduction of the Principal-Agent-Problem for an outsourcing relationship taking the outsourcing of IT-Infrastructure-Services as an example. In equation (9) we showed that within an optimal contract the marginal utilities of both parties involved have to be proportional to each other. Furthermore, the fee payable to the Service Provider depends on the Likelihood-Ratio as an indicator for the effort actually taken by the Service Provider. These two results are analyzed in further detail in the following sections. As symmetrical distributed information cannot be assumed in reality, the focus of the following is on asymmetrically distributed information (i.e. second-best-solution).

Results Derived from the Ratio of Marginal Utilities

We first focus on the left side of equation (9) by analyzing possible values for the ratio of marginal utilities. The results and consequences of the respective values are described in the following Table 1.

Case	Value of Ratio of Marginal Utilities	Result	Consequence
1	$\frac{G'(x-s(x))}{U'(s(x))} \leq 0$	The utility of one party increases while the utility of the other party decreases or is not affected at all	➔ No contract will be signed
2	$\frac{G'(x-s(x))}{U'(s(x))} = 1$	Marginal utilities of parties involved are the same	➔ Contract will be signed; 'fair' sharing of risks and benefits
3	$0 < \frac{G'(x-s(x))}{U'(s(x))} < 1$	Marginal utility of service provider is lager than marginal utility of outsourcer	➔ Incentive compatible system is difficult to implement as service provider is always better off than the outsourcer
4	$\frac{G'(x-s(x))}{U'(s(x))} > 1$	Marginal utility of outsourcer is lager than marginal utility of service provider	➔ Incentive systems should reward high effort with high payments so that the service provider have a chance to increase their marginal utility

Table 1. Overview – Ratio of Marginal Utilities

In Case 1 the value of ratio of marginal utilities equals or is smaller than zero. This implies that one party can increase its utility only at the cost of the other party, or; one party is not affected at all. Therefore, no contract will be signed. In Case 2 the ratio of marginal utilities equals one. Consequently, the implied benefits and risks will be equally shared. Case 3 refers to the possibility that the ratio of marginal utilities is larger than zero and smaller than one. In this scenario, the Outsourcer's marginal utility is smaller than that of the Service Provider. It is therefore difficult to set up an incentive system for the Service Provider as they are already better of than the Outsourcer is. In Case 4 the Outsourcer is better off as the marginal utilities is greater than one. In this case, an incentive compatible Penalty-Reward-System offers great advantages to the Outsourcer**.** The Service Provider is in an inferior position regarding their marginal utility. The marginal utility of the Outsourcer increases more than that of the Service Provider. Therefore, the Outsourcer have to provide the Service Provider with incentives via the Likelihood-Ratio. This incentive should work in a way that a higher effort taken by the Service Provider is rewarded with a relatively high payment. Thereby, the Service Provider is able to increase their marginal utility.

Answering the first research question, our theoretical findings show that the marginal utilities of both parties involved have to be proportional to arrive at an 'optimal' contract. The ratio of marginal utilities implies for our outsourcing example that a decrease in the Outsourcer's costs has to be accompanied by an increase of the Service Provider's profit. In reality, this proportionality can be implemented by the agreement of respective contract clauses. During expert interviews it turned out that there are two possibilities for such an implementation.

First, a contract mechanism that comprises three different clauses which can be agreed upon. During contract negotiations the Outsourcer and the Service Provider have to disclose their cost calculations. This is a challenging but important step towards an optimal contract. Based on this information (1) a pricing scheme that is advantageous for both parties has to be agreed upon. To ensure proportionality of the respective cost functions in the long run, (2) a price cap combined with a (3) renegotiation option has to be implemented. If, for example during the outsourcing of IT-Infrastructure-Services the number of used server capacity exceeds or falls below a certain limit, prices have to be renegotiated again. Due to economies of scale and scope the Service Provider should be able to reduce unit costs when volumes increase. In turn, if volumes decrease they may increase fees due to reduced economies of scale and scope. Second, both parties can agree upon a pricing scheme that reflects proportionality of cost functions without exactly disclosing them. This can be implemented by an agreement on graduated prices (e.g. the usage of 1,000 to 5,000 MIPS within one month costs 2,000 €, the usage of 5,001 to 10,000 MIPS costs 3,000 €, etc.). Here, the unit price also decreases when volumes increase due to the realization of further economies of scale and scope one the side of the Service Provider.

Results Derived from the Likelihood-Ratio

As shown in Table 1 the ratio of marginal utilities – which is subject to negotiations – can have different values. The importance of the Likelihood-Ratio depends on the respective value. The Likelihood-Ratio is a 'sound' indicator regarding the level of effort taken by the Service Provider. To illustrate this again, the relationship between the Likelihood-Ratio and the other variables introduced in the Principal-Agent-Setting is highlighted in the following Figure 1.

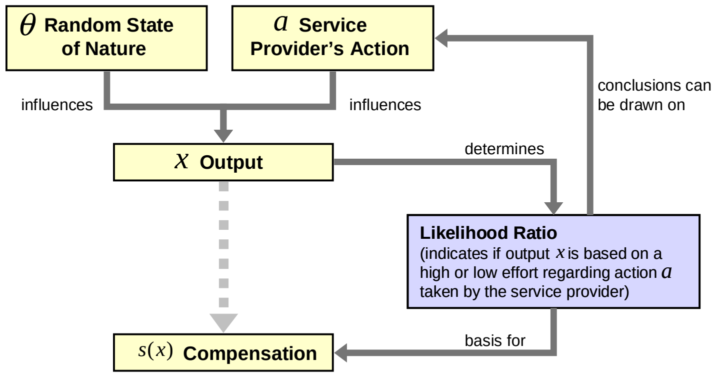

Figure 1. Overview – Input Variables

The random state of nature θ and the effort a are the two variables that influence the output. As the random state of nature cannot be influenced, a is the only variable that can be affected. Providing incentives *ex ante* influences action a chosen by the Service Provider. By observing the Likelihood-Ratio $\frac{f_a(x,a)}{f(x,a)}$ it can be determined whether or not the outcome is based on a high effort level chosen by the Service Provider. The Likelihood-Ratio indicates the impact of effort a on output x. Not achieving a high output x indicates that the Service Provider put a low effort in producing this output. Depending on the value of this ratio a respective Penalty-Reward-System should be set-up. The following Figure 2 illustrates the mechanisms that should be incorporated in such a system.

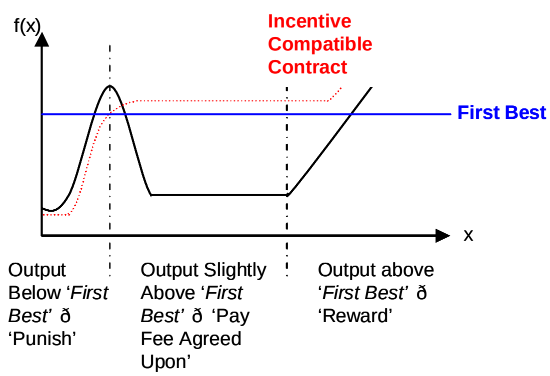

Figure 2. Overview - Penalty-Reward-System

Within the above Penalty-Reward-System low payments $s_L(x)$ are agreed upon if the Outsourcer observes low outcomes x_L (left part of Figure 2). Thereby, the Service Provider have an incentive to choose a high effort as they would otherwise be 'punished'. In contrast, high outcomes should be rewarded with high payments to incite high efforts (right part of Figure 2).

Answering our second research question, the Outsourcer should implement incentives based on the outcome. The Likelihood-Ratio is a 'sound' signal whether or not the outcome was achieved with a high effort. Case 2 and Case 4 in Table 1 are most suited to implement a Penalty-Reward-System based on the Likelihood-Ratio. In reality, the observed outcome should be measured and penalized/rewarded based on a Service-Level-Framework. According to Domberger, Fernandez and Fiebig (2000), Service-Levels should, for example, comprehend agreements on service availability, response in emergencies, accuracy, and minimization of downtime.

Summing up, during contract negotiations a variable compensation scheme (i.e. a fixed-fee per unit, but a variable amount in volumes) that considers proportionality of marginal utilities of the parties involved should be agreed upon. The Penalty-Reward-System — which is also determined during contact negotiations — should be based on the observable outcome. Final compensation of the Service Provider therefore consists of the unit-based fee and the penalties/rewards which depend on the observed outcome. Whether or not these theoretical findings are implemented in real contracts will be analyzed in further detail in the next section based on a single case study.

EVIDENCE BASED ON SINGLE CASE STUDY RESEARCH

Methodology

To achieve the necessary rigor, case studies need to be prepared and carried out thoroughly. It is important during design and preparation to explicit the research question, propositions, and unit of analysis (Eisenhardt, 1989b). The research questions employed for these case studies are ‘*What’* and ‘*How*’ questions. These types of questions are considered appropriate for case studies (Yin, 2003). The propositions used in our cases are grounded theoretically (see section 3 “Formal derivation of the Principal-Agent-Problem”). As unit of analysis we chose outsourcing relationships.

We interviewed the project manager, the contract manager, and the manager of the retained organization of an IT-Infrastructure-Outsourcing deal. From the project manager we wanted to learn more about the history of the outsourcing deal. The contract manager and the manager of the retained organization provided us with details on how the contract and its set up is actually ‘working’ and whether a ‘fair’ sharing of risk and reward takes place.

The pre-structured interviews lasted about four hours and were conducted by two researchers. The interview partners provided us with additional contract documentation. The answers given together with the respective documents were, analyzed and refined based on Eisenhardt (1989b) and Yin (2003). The interviewees reviewed and validated the collected case study data and reports. This procedure follows the literature on single case study methodology (Lee, 1989).

Case Study Analysis

Our research analyzes an outsourcing deal of IT-Infrastructure-Services within the European Banking Industry. The banking industry has been chosen due to its business being IT-intense. The findings relevant for our research are summarized in the following Table 2.

Characteristics	Bank A
Outsourced service:	IT Infrastructure Services
Deal volume (per year):	> 1,000,000 €
Percentage of outsourced sub-processes compared to the overall process:	> 90%
Outsourcing objectives:	- Cost savings - Variabilization of fixed costs - Quality improvements - Standardization - Risk reduction
Familiarity of outsourcer with service provider's cost calculation	Only the basic cost drivers are known
Familiarity of service provider with outsourcer's cost calculation	No
Equal sharing of risk and reward (outsourcer's perception)	No
Understanding of the relationship as a partnership (outsourcer's perception)	Outsourcer feels that they are on the way to establish a partnership
Existence of jointly negotiated SLAs	Yes
Combination of SLAs with a Penalty-Reward-System	Yes
Regular controlling of SLAs	Yes, once a month SLAs are controlled. Twice a year the respective penalties/rewards are settled.

Table 2. Overview – Case Study Results

Bank A does not know any details regarding their Service Provider’s cost calculation. They are only familiar with the basic cost drivers as prior to outsourcing the service was provided in-house. In turn, they do not think that the Service Provider is aware of their cost calculation. This indicates that during contract negotiations the respective cost calculations have not been disclosed by neither party. Furthermore, no graduated pricing has been agreed upon. Bank A thinks that risk and return are not shared equally. However, they believe that they are on the way to establish a partnership with their Service Provider. According to Saunders, Gebelt and Hu (1997) a true sharing of risk and return needs to take place to establish a partnership. Therefore, from an academic perspective they are far from establishing a true partnership. This case highlights the importance of disclosing utility functions (e.g. cost calculations within the outsourcing) to arrive at a ‘fair’ sharing of risk and reward.

Bank A and their Service Provider have agreed upon Service Level Agreements (SLAs). These SLAs include agreements on service availability and timeliness, response in emergencies, accuracy, and minimization of systems' downtime as suggested by Domberger et al. (2000). The SLAs are linked to a Penalty-Reward-System. Thereby, Bank A provides their Service Provider with an incentive to act in their interest. To determine the degree of fulfillment of the contracted services, Bank A has set up a monitoring system that captures the actual fulfillment of all services. Thereby, Bank A relies on the output as a 'sound' signal for the effort actually taken by the Service Provider. Overall, Bank A is satisfied with the service delivery of their Service Provider. They feel that their Penalty-Reward-System is working well as on average penalties are imposed only twice a year. Therefore, we understand that Bank A's incentive system is working properly as it provides the Service Provider with incentives to deliver the services agreed upon in a high quality and timely manner.

We conclude that the establishment of respective mechanisms to ensure proportionality of utility/cost functions is of utmost importance to set up a partnership with a true sharing of risk and reward. This can be reached by either agreeing on contract mechanisms that comprehend different clauses or by negotiating graduated prices. The probability that the Service Provider chooses a disadvantageous action can be minimized by synchronizing the objectives of the Out- and Insourcer through the negotiation of SLAs *ex ante* and agreeing on Penalty-Reward-Mechanisms which become effective *ex post*. Thereby, the asymmetric distributed information between both parties can be reduced.

CONCLUSION

Our research contributes in two ways. For academia, our research provides a detailed analysis of contract design based on a sound theoretical foundation, namely, the Principal-Agent-Model. So far, there is a lack of research on normative Principal-Agent-Theory addressing outsourcing contracts. We are aware that a contract represents the results of bilateral negotiations. However, Outsourcers can benefit from our research by knowing which mechanisms and clauses should be especially carefully negotiated as they greatly influence the outcome of the outsourcing deal.

Our research is limited in two ways. First, generalization is limited as evidence is based on single case study research. Second, like Holmström (1979) and Ross (1973), we assume that the Service Provider is risk-averse. We suggest for further research to also analyze the case of the Service Provider being risk-neutral.

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