An Empirical Investigation of IS Outsourcing in Japan

Seigo Matsuno, Takao Ito, Yasuo Uchida, and Shin-ya Tagawa

***Abstract*—**Two typical different patterns of Information Systems (IS) outsourcing are considered as the most effective approaches of business strategy. They are conventional outsourcing and quasi-outsourcing. The later generally is often adopted in large-scale organizations in Japan. In most such cases, an IS subsidiary is established by spinning off the firm's own information systems department. However, in recent years, most companies strengthen capital alliances relationship between their IS subsidiary and external vendors, while some companies sell their IS subsidiary for separating it completely from their parent company. On the other hand, there is growing diversification in the arrangement/management of IS subsidiaries. For instance, some firms force their IS subsidiary to withdraw from external sales business while other firms go further and integrate their IS subsidiary back into their parent company again (i.e., backsourcing). This research employs case study in order to investigate the determinant factors which have strong effect on these IS subsidiary arrangements. In this paper, we first review relevant previous studies on IS outsourcing. And then we introduce case studies of two chemical manufacturing companies in Japan and discuss its implications. Finally, we propose some propositions based on the implications derived from the case studies. This paper therefore provides an empirical perspective of the IS outsourcing in Japan.

***Keywords*—**Case Study, Information Systems Outsourcing, IS subsidiary, Quasi-outsourcing, Resource-based View, Transaction Cost Economics

I. Introduction

OUTSOURCING is one of the most important business strategies that a large number of corporations have used for decades. In order to get work done more efficiently and increase flexibility to meet the changing business and commercial conditions, outsourcing for supply chain has drawn considerable attention in recent years [1]–[4]. Most business process outsourcing (BPO) involves executing standardized process for a company [5]. For instance, knowledge process outsourcing (KPO) involves process that demand advanced research and analytical and technical skills of decision-making. Information technology outsourcing (ITO) is defined as "the transfer of property or decision rights in varying degrees over the IT infrastructure by a user organization to an external organization." [6] ITO services markets, together with more recent offshore variants, have been dynamically expanding revenues, capabilities and associated rhetoric for over a decade. Willcocks et al. [7] estimate and indicate that "ITO global revenues exceeded $200 billion per year at the end of 2005. After, and indeed partly because of, the slowdown between 2001- 2004 this figure will rise by at least 7% per annum for the next five years." The process of turning over part or all of an organization's information systems (IS) functions to external service provider(s) is called IS outsourcing (ISO). Therefore, Information systems outsourcing could be considered as a subset of business process outsourcing. It is done to require economic, technological, and strategic advantages [8] [9]. In general, IS outsourcing can be classified into two typical different patterns: conventional outsourcing and quasi-outsourcing [10] [11]. The former is based on a contract with an external vendor. The later means to set up their own IS subsidiary which is defined as "a firm that is partially owned by the parent, but independently managed" [12]. Quasi-outsourcing is an alternative to complete insourcing and complete outsourcing [10], and is often adopted in the large-scale firms in Japan. However, the diversification of IS outsourcing for subsidiary has been widely seen. For instance, there have been many firms which strengthen or keep strategic alliances of capital between their IS subsidiary and external vendors, or sell their subsidiaries and dissolve the partnership completely for separating them from their parent companies. On the other hand, some parent companies force their IS subsidiaries to withdraw from external sales business, i.e., sales outside the parent company's group, or go further and internalize the IS subsidiary back into the company again (so-called backsourcing) [13].

Only a few studies of the determinant factors that have influence on decision of adopting outsourcing have been published until today. The main contribution of this paper is to propose some propositions related to determinant factors affecting on IS subsidiary arrangement based on our original case studies in Japan.

This paper is organized as follows. In Section 2, we briefly review some previous arguments of IS outsourcing. After reviewing the relevant literature on IS outsourcing, we introduce case studies of two chemical manufacturing firms in Japan both adopting the pattern of quasi-outsourcing in Section 3. In Section 4, we discuss the implications derived from the

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case studies, and develop some important propositions. Finally, in Section 5 we conclude by a summary of this paper and mention our future work.

II. Theoretical Perspectives on IS Outsourcing

Most of the studies of outsourcing have been published recently. Transaction cost economics (TCE) and the resource-based view (RBV) are considered as the most typical theories.

A. Transaction-Based Argument

Transaction cost economics (TCE) posits that organizations insource when the costs of using the market are higher than internal governance costs [14]–[21]. Markets generally lead to smaller production costs, because of economies of scale obtained by suppliers/vendors. However, markets lead to higher transaction costs arising from three principal attributes of transactions: asset specificity, uncertainty, and frequency [17].

Asset specificity for IS outsourcing has two aspects; for business of a client company supported by the developed information systems and for technologies which external vendors utilize. If the business that a client company outsources is unusual, external vendors have to be familiar with the business so that the asset specificity will occur on mainly human resources. Similarly, if technology used by external vendors is specific, it will be hard to use the information systems for other purposes on the client company. Investment to these unusual assets causes a "fundamental transformation" [17]. Therefore, the transaction costs would increase.

Hence, if it is necessary to reduce the risk of opportunism resulted in asset specificity and to restrict the increase of transaction costs, quasi-outsourcing would be selected. This is because a client company can wield an influence on its IS subsidiaries depending on its investment ratio under the operation of quasi-outsourcing.

B. Resource-Based Arguments

The resource-based view (RBV) based on the original work of Penrose [22] posits that organizations insource when a resource or capability is strategic so as to enable them to sustain competitive advantage [23]–[27]. It builds upon four properties of the strategic resource: economic value, rareness, imperfect imitability, and non-substitutability [24]. The RBV is important to the study of IS outsourcing, as superior performance achieved in IS activities related to external vendors would explain why such activities are performed internally.

Thus understanding of managerial resources as an advantage for the company is called core competence in general today. Prahalad and Hamel [28] [29] define the core competence as "a combination of technologies and production skills which is based on the company's infinite product lines". However, this is understood more broadly today and is interpreted as their resources and abilities, which are difficult to be imitated and implemented by other companies, as a source of the company's sustainable competitive advantage.

From the viewpoint of the RBV, competitive advantage of organizations can only be achieved through a focus on the core competencies, the management of organizations have chosen to concentrate on what an organization does better than anyone else while outsourcing the rest. And if it is required to be controlled strategically again, insourcing the businesses which are outsourced in the past will be reconsidered.

C. Conventional Outsourcing vs. Quasi-outsourcing

The rich number of studies of IS outsourcing was conducted in the past, having been approached from various points of view [8]–[10] [30]–[49]. Especially, in the previous study on the two patterns of IS outsourcing, some focus on factors of the influence on its selection. For instance, Barthelemy and Geyer [10] classify the factors of the influence on the choice of either conventional outsourcing or quasi-outsourcing into internal and external factors. They focus on testing some hypotheses which are suggested based on the TCE approach, but they do not refer to the RBV arguments. The approaches of TCE and the RBV are treated as independent argument so far, but the phenomena of IS outsourcing cannot be fully explained by either theory of these two theoretical perspective. Then there is a growing bodies of research on the recognition that TCE and the RBV are complementary one another [30] [50]–[57].

Other studies show that different effects and problems of IS outsourcing caused from the different patterns [11]. However, many studies found different effects of IS outsourcing between conventional outsourcing and quasi-outsourcing. For instance, it is overall supported that "using new technology" in conventional outsourcing has stronger effect than that in quasi-outsourcing. On the other hand, the issue is still under discussion whether the effects of "cost saving" and "improvement of planning and development of IS skill" of these two patterns of outsourcing are different or not.

According to the Japan Information Processing Development Corporation, the companies setting up their own IS subsidiary now is only 8.3% as a whole in Japan (see Table 1) [58]. However, most of the IS subsidiaries are established based on the scale of their parent company. 25.5% of the companies which have employees more than 1000 and less than 5000, and 61.8% of the companies having more than 5000 employees have their own IS subsidiary. This report reveals in detail that large-scale companies tend to establish their own IS subsidiary by spinning off their in-house information systems department.

The results of the recent survey by *the Japan Users Association of Information Systems* found that, among the requirements placed on IS subsidiaries and external vendors by user companies, a company's planning and proposal capability for "restructuring business process using IT" has more high value than "reduction of development/ operation cost" in Japan [59]. Therefore, the fact that quasi-outsourcing provides greater familiarity with the parent company's work can be regarded as a significant advantage over conventional outsourcing. Empirical analysis by Hamaya [60] has also shown that, in outsourcing to

IS subsidiaries where there is a capital relationship, i.e., quasi-outsourcing, there is a tendency for the degree of review of business process at the parent company to increase significantly.

Table 1 Relationship between IS subsidiary and its breakdown

	Yes				No
Number of employees		Spinning of its own IS Dep.	Joint venture	M&A	
1000-5000	25.5	19.5	4.5	1.5	
Over 5000	61.8	47.1	8.8	5.9	
Total	8.3				85.7

However, on quasi-outsourcing in recent years, a number of distinctive trends have appeared in management of IS subsidiaries. A diverse variety of cases have been observed, such as: (1) capital alliance with an external vendor (majority investment ratio or higher), (2) capital alliance with an external vendor (less than majority investment ratio), (3) complete sale of IS subsidiary to external vendor, (4) withdrawal from external sales, (5) integration back into the parent company, and so on. Fig.1 shows a conceptual framework of the two typical patterns of IS outsourcing and its diversity related to IS subsidiary arrangement. The Shift towards complete outsourcing denoted as the pattern (1), (2), and (3) in Fig.1 means that the degree of market coordination rises successively. On the other hand, the shift to complete insourcing denoted as the pattern (4) and (5) in Fig.1 rises the degree of hierarchical coordination.

Why does a certain company push a wholly owned IS subsidiary in the direction of conventional outsourcing through capital alliances and/or assignation? Conversely, why does a certain company move back toward insourcing by forcing its IS subsidiary to withdraw from external sales business, or calling it back to their parent company? This research investigates the determinants that have influence on whether firms adopting quasi-outsourcing are increasing, decreasing, or keeping their current outsourcing level.

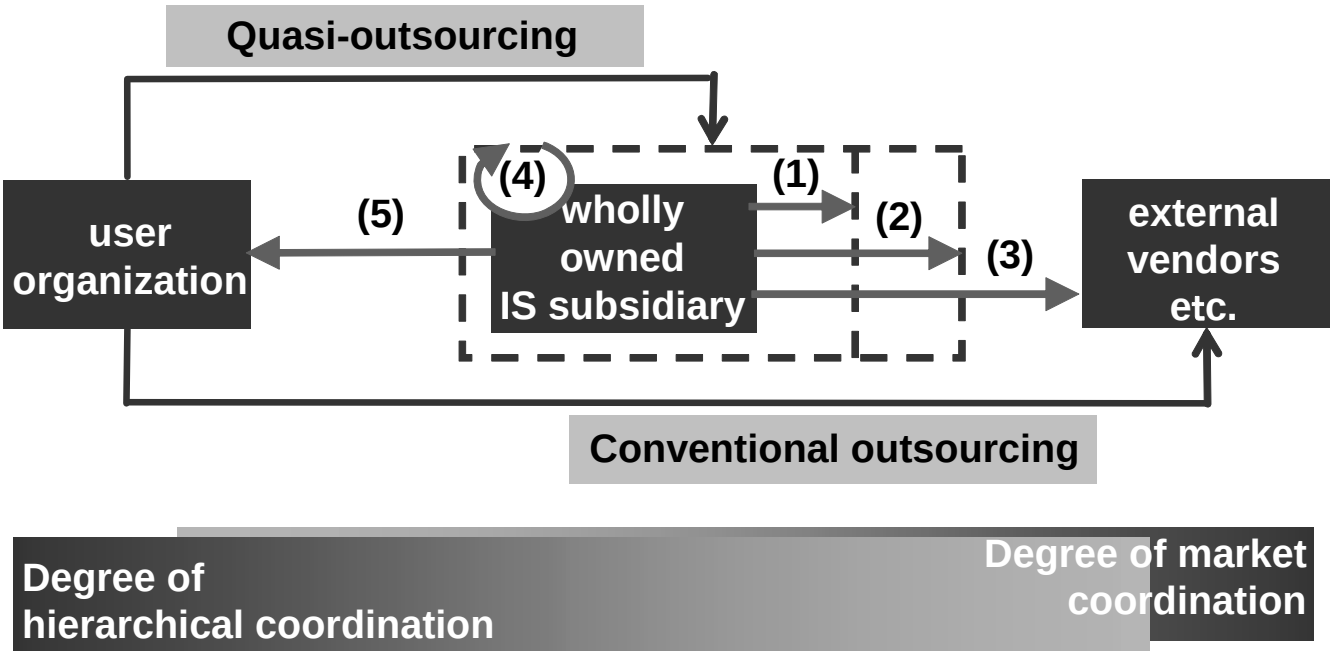

Fig.1 Diverse variety of quasi-outsourcing

III. Research Method

Many analytical tools can be used for identifying outsourcing strategy. Case study approach generally is considered as one of the most useful tools.

A. Case Study Approach

The case study approach is allowed the researcher to analyze relationships and social processes that is not possible via a quantitative approach alone [61] [62], and is useful as a means of understanding and explaining the context of contemporary activities such as IS outsourcing. In order to better understand and analyze how firms adopting quasi-outsourcing change their current outsourcing level, we investigate two chemical manufacturers in Japan.

These two companies are chosen for a number of reasons. One of the most important reasons is each company had already outsourced a range of their IS activities. And, the patterns of outsourcing in these two companies are the quasi-outsourcing.

For each one company, data are collected from unstructured interviews and semi-structured questionnaires with managers who had been involved in the decision process of IS activities [63]–[65]. To ensure the validity and to keep the reliability of our case study, we also use multiple sources of evidence including various archival data, additional interviews, and so on [66] [67]. Table 2 shows the outline of the two case's brief descriptions. Two companies are both adopting the pattern of quasi-outsourcing. However, their IS subsidiary arrangement is different. We address the differences of the arrangement of IS subsidiary among the two cases, and attempt to derive some meaningful findings and implications.

Table 2 Outline of the two case's brief descriptions

No.	Parent Company	IS Subsidiary	Description
1	Tokuyama Corp.	Tokuyama Information Service Corp. (TJS)	Wholly owned by Tokuyama
2	Ube Industries Co., Ltd	Ube Information Systems, Inc. (UIS)	Change from wholly owned to 49%

B. Case of Tokuyama Corp.

Tokuyama Corp. is a second-tier general chemical manufacturer founded in 1918, and Tokuyama Information Service Corp. (hereafter, TJS) was established by spinning off its in-house information systems department in January 2003. Capitalization of TJS is about 20 million Japanese yen, and the company is wholly owned by Tokuyama. Sales are approximately 1.7 billion yen, and this company has about 40 employees (all figures are for the fiscal year ended in March 2006).

As a shared service center (SSC), TJS has the role of providing IS services to the Tokuyama Group. After being spun off, the company remains in charge of planning and proposing the information strategy of its parent company Tokuyama. It is entrusted with and manages all IS activities for the Tokuyama Group, from information infrastructure building and operation, to development of business/communication systems. Fig.2 describes the relationship between Tokuyama and TJS.

At present, Tokuyama has established an in-house Corporate Planning Division, headed by a Managing Director, and the Planning Group within that Division is in charge of planning and management of the information strategy for the entire Tokuyama Group. However, this is not a dedicated organization, and thus the TJS side, which is familiar with real IS activities in the practical field, is expected to play a role in systems planning and information strategy as its contribution to management. Therefore, TJS is not involved in external sales business at present.

The mission of critical system in Tokuyama Group is a mainframe-based legacy system, self-developed in the PL/I language, which has been operating since 1991. The system is called *IRIS*, and it integrates various business systems such as production, purchasing and sales, and management systems such as personnel, accounting and budget control in Tokuyama Group. This company-wide information system have been built and operated for many years in a fashion which is highly suited to the specific work and processes at Tokuyama and is still operating today.

In this case, relationship between Tokuyama and TJS is similar to the pattern (4) in Fig.1 mentioned in Section 2. Because TJS is still wholly owned IS subsidiary by Tokuyama, and is not involved in external sales until today.

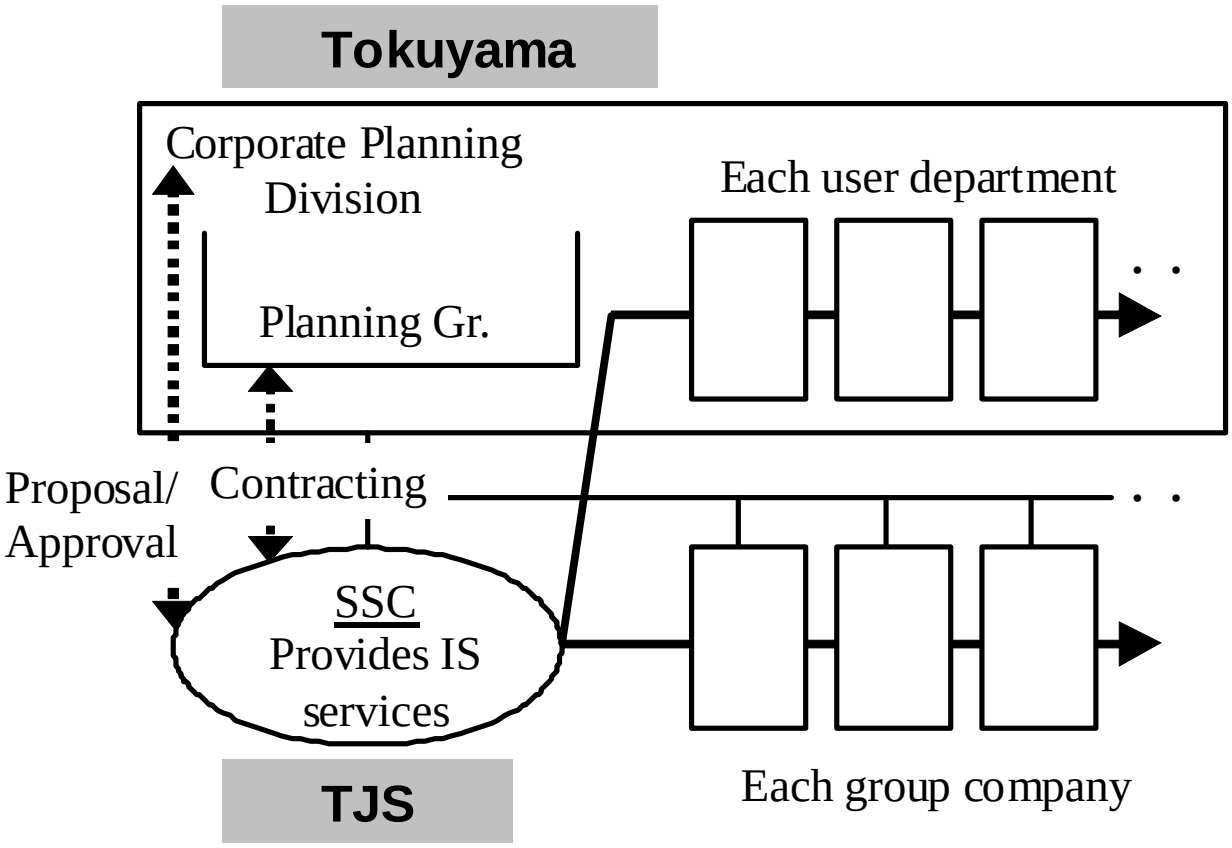

Fig.2 Relationship between Tokuyama and TJS
Source: Produced by the authors based on the interview

C. Case of Ube Industries

Ube Industries, Ltd. is a major chemical manufacturer established in 1897, and it established the wholly owned Ube Information Systems, Inc. (hereafter, UIS) in September 1983 by spinning off its in-house information systems department. Later, in March 2001, Osaka Gas Information System Research Institute Co., Ltd. (hereafter, OGIS), an IS subsidiary of Osaka Gas Co., Ltd., made a majority investment in UIS. Capitalization of UIS is 100 million Japanese yen (OGIS: 51%, Ube Industries: 49%). Sales are approximately 5 billion yen, and the company has about 300 employees (all figures are for the fiscal year ended in March 2006).

At present, Ube Industries has established an in-house Corporate Planning & Administration Office, headed by a Director and Managing Executive Officer, and the information systems department in that Office is in charge of information strategy for the entire Ube Industries Group. The primary work of the staff of about 30 persons in the information systems department (including those belonging to subsidiaries) is information systems planning, and the staffs are not involved directly in systems development and operations activities.

Differing from TJS, since spinning off from Ube Industries, UIS has developed into a profit center, and at present has achieved an external sales ratio of about 40%. At the same time, however, UIS has established a "UBE Solutions Group" with 3 departments, including a systems development department, and in practice, that Group plays the role of an exclusive team for the Ube Industries Group. This organization is comprised of about 100 staff that has extensive knowledge about business process of Ube Industries, and has been maintained even after the investment by OGIS (see Fig.3).

The mission of critical system in Ube Industries was switched over in stages from the mainframe-based legacy system to the ERP package in a program of system rebuilding called the "RS21 Project" which started in 1999. The switchover process is completed in April 2003.

In this case, relationship between Ube Industries and UIS and latter capital participation in UIS by OGIS means the pattern (2) in Fig.1 mentioned in Section 2. The reason is that UIS has been changed from wholly owned to 49%.

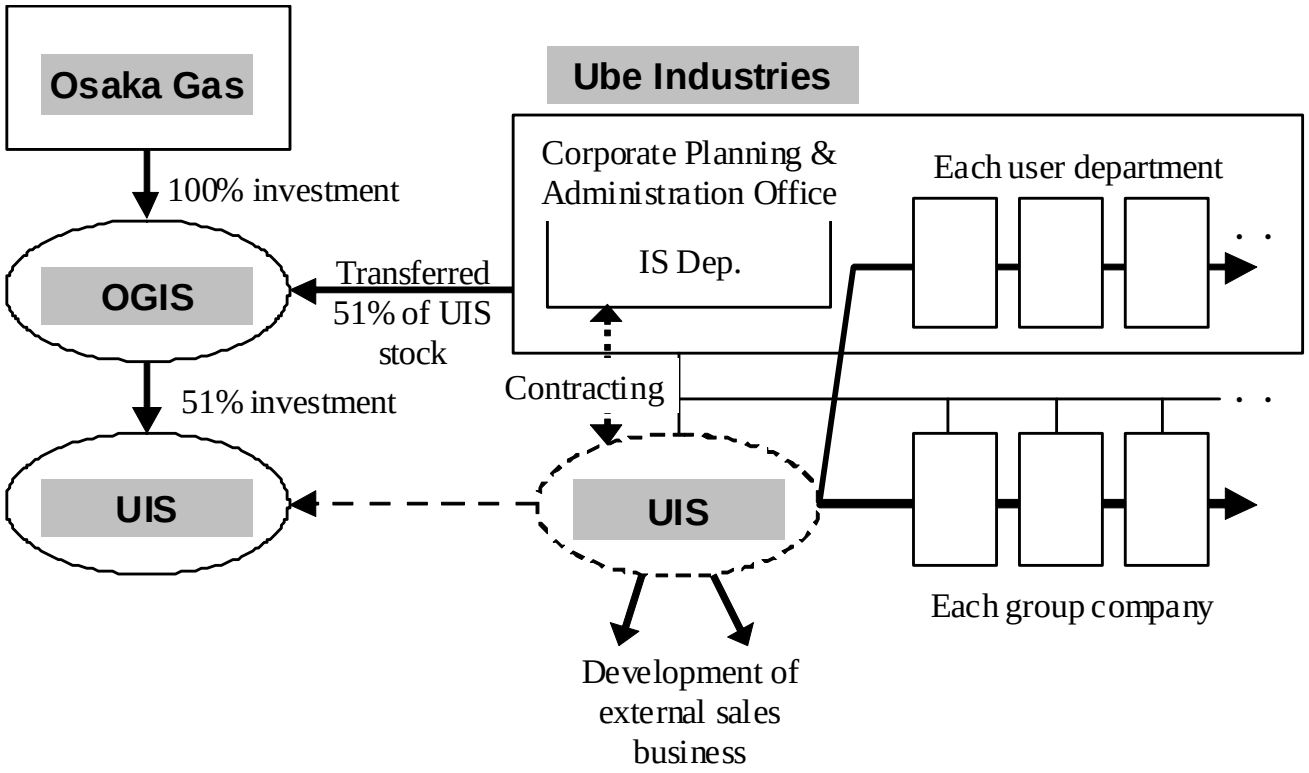

Fig.3 Relationship between Ube Industries and UIS, and capital alliance between UIS and OGIS
Source: Produced by the authors based on the interview

IV. Discussion and Propositions

Two typical cases of outsourcing are investigated. Most of the same phenomena also can be observed in other companies. Managerial implications can be considered as follows.

A. Asset Specificity

At Tokuyama, company-wide information systems have been built and operated for many years in a fashion which is highly suited to the specific work and processes at Tokuyama, and thus is highly asset specific. This is likely the motivation for why Tokuyama continues with the current approach of using TJS as an IS subsidiary. The reason is that, in the current situation, where TJS is a wholly owned subsidiary, and workers dispatched from the parent company are in the majority, there are likely to be incentives for the TJS staff to cumulatively invest in knowledge and skills specific to the business of Tokuyama.

However, in April 2006, Tokuyama reviewed its contract system with TJS, and switched to service level agreements (SLAs) and fixed-rate yearly contracts in 4 areas: information system operations (including small-scale development), communications, support and security. Efforts toward standardizing contracts in business fields like this, which have relatively low uncertainty, may lead to a shift toward a more "arm's length" relationship between the two companies in the future.

In Ube Industries, on the other hand, where the mission critical system has been switched to an ERP package, customization focusing on work content and processes specific to the company was partially done, but in the RS21 Project, efforts have been paid to restructure work in accordance with the standard specifications provided by the package. From the perspective of TCE, this sort of drop in asset specificity relating to IS activities is likely to decrease the opportunism which is a threat in their market transactions. Due to the above, we present the following propositions:

Proposition 1a. *For companies which adopt quasi-outsourcing, lower of asset specificity relating to IS activities increases the incentive to shift to conventional outsourcing.*

Proposition 1b. *Switching the legacy systems to the ERP-packaged systems, and/or efforts to standardize contracts via SLAs, reduce the asset specificity of IS activities.*

B. IS Cost Centers vs. Profit Centers

Partly due to the relatively short time since it was founded,

TJS's mission is considered as important tool to contribute to management of the Tokuyama Group as a SSC, and does not go beyond the scope of a cost center. At UIS, on the other hand, the external sales rate has already reached 40%. Thus UIS is an equity method affiliate from the standpoint of Ube Industries, and is expected to contribute as a profit center.

In the beginning, an IS subsidiary can expect a certain degree of orders from its parent and group companies, and thus has an aspect which is independent or spin off [12]. However, in order to make an IS subsidiary into a profit center, it must be able to achieve economies of scale by further expanding the scale of its business. To do that, IS subsidiaries need to make efforts such as strengthening their sales capabilities for external sales business, and improving their specialized knowledge and skills.

From the perspective of the RBV, if self-development or procurement of the resources and capabilities required by a firm is difficult or costly, that can become a factor in choosing alliances with other firms [24]. In fact, UIS seized the opportunity to learn object-oriented programming skills through its capital alliance with OGIS whose strength lies in that area. Profit centers have incentives to reach a level of performance close to that of the best outside vendors. Hence, we propose the following proposition.

Proposition 2a. *For companies which adopt quasi-outsourcing, progress of the IS subsidiary toward becoming a profit center increases the incentive to form alliances with external vendors.*

However, from the perspective of TCE, in that sort of alliance, the threat of opportunism by the partner may become a problem. Particularly, in an alliance with a specialized external vendor, there is a danger that the threat of opportunism will increase for reasons such as asymmetric information or conflicting goals. On that point, OGIS is an IS subsidiary whose sales to the Osaka Gas Group constitute about half of its total sales, and thus in the alliance between UIS and OGIS, there is a possibility that the threat of opportunism can be relatively reduced. Due to the above, we present the following proposition.

Proposition 2b. *Alliances between subsidiaries within the group of user companies' enables reduction of the threat of opportunism compared to alliances with specialized vendors.*

C. IS Activities vs. Core Business

Tokuyama and Ube Industries have differences in their size and degree of diversification, but their primary core businesses are chemical products and fine chemistry, and their core resources and capabilities are research and product development, and manufacturing/applied technology in their domain. Therefore, unlike an information intensive industry, resources relating to IS activities, and the organizational capabilities to make use of those resources, do not themselves play a central role at either company.

However, as pointed out by Bharadwaj [31] as well as Hamaya [60], even if there is no advantage in terms of information systems themselves, they have an important role in supporting business processes such as production, sales and product development, and outsourcing IS activities may have a negative effect on competitiveness in the core businesses which are the company's strength. The RBV suggests that IS activities to support core businesses where the company has a competitive advantage should be insourced [24]. Therefore, in general, we can propose the following proposition.

Proposition 3a. *For companies which adopt quasi-outsourcing, expansion of core businesses and increasing inseparability of IS activities increases the incentive for backsourcing.*

However, if we limit ourselves to only the aforementioned two cases, it is difficult to specifically determine how much of an overall contribution IS activities make to the growth of core businesses. Instead, what we should look at is whether or not changes arise in the roles expected of IS activities, which although they are not core competencies themselves, are one of the functions necessary for business.

For example, at Tokuyama, there is an understanding (revealed in interviewing with Mr. M, the Planning Group Leader) that "In the current situation, where TJS is not involved in external sales business, there is room to reconsider the advantages of insourcing, in order to ensure the close communication necessary for speedy system development and business restructuring using IT."

In Ube Industries, on the other hand, after the spun off of UIS, there has been increasing immobilization of the staff of the in-house information systems department, and thus development of human resources has become an urgent issue. In general, IS activities require not only familiarity with the company's own work, ranging from information strategy planning, drafting of requests for proposals, proposal evaluation, and monitoring of contract conditions; it is also required technical knowledge and skills relating to information systems. In order to stably manage and control this sort of IS activities over the long term; Ube Industries has begun to make their efforts to accumulate experience by temporarily assigning young employees to UIS. For the future development, they are also looking at reverse assignment, where they get human resources from UIS. Flexible response to changes in the volume of system development projects, and accumulation of knowledge and know-how relating to IS activities are recognized as being indispensable. Due to the above, we present the following proposition.

Proposition 3b. *For companies which adopt quasi-outsourcing, expanding the role of IS activities as an infrastructure supporting core businesses increases the incentive to maintain and/or strengthen quasi-outsourcing.*

V. Future Work

The main contribution of this paper is to propose some

propositions related to factors affecting on IS subsidiary arrangement based on our original case studies in Japan. Despite some meaningful implications, this study has several limitations. For instance, on recent phenomena, there are many cases that IS activities, assets and personnel which were outsourced in the past are insourced again, especially in finance and insurance industries in the U.S. In Japan, part of IS subsidiaries are changing their work to new managerial issues such as internal control and information security and so on.

Much more analysis, development of specific working hypotheses, and verification of those statistical tools using survey data are required in near future. Thus, other factors assumed to affect IS outsourcing decision, especially for management/arrangement of IS subsidiaries also will become one of the important issues [68]. For instance, finance-related effects of the capital policy (e.g. improvement of short-term financial performance through the sale of IS subsidiary stock), effects from the institutional environment, such as corporate law, acts of protecting personal information, risk management [69] [70].

Furthermore, strategic alliance relationship is also one important part in outsourcing. Historical and qualitative analyses of strategic relationship have been undertaken [71]. Recently many studies have also focused on the analysis of the strategic relationships among the firms [72]–[74]. These studies measured the relationship among firms, and proved the causal relationship between firm's relation and corporate performance [75]–[78]. Relationship analysis between firm's relationship and outsourcing will be one of the most important issues.

VI. Conclusion

The aim of this study was to provide a new perspective on IS outsourcing research. First, we briefly review some previous arguments of IS outsourcing. Second, we introduce case studies of the two chemical manufacturing firms in Japan both adopting the pattern of quasi-outsourcing. Third, we discuss the implications derived from the case studies, and develop some important propositions.

This paper proposes propositions relating to factors affecting management/arrangement of IS subsidiaries, based on implications derived from case studies of two chemical manufacturers in Japan. Especially, we addressed 3 points: asset specificity, shift from cost centers to profit centers, and contribution of IS activities to firm's core business from the viewpoint of TCE and the RBV.

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