The Dynamics of Alignment: Insights from a Punctuated Equilibrium Model

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Although there is much emphasis on the importance of achieving alignment, or synergy, between information systems and the organization as a whole, there is relatively little close study of how alignment is actually achieved. In three case studies, Saberwal, Hirschheim and Goles describe the evolution of information systems alignment with organization strategy and structure. Their analysis highlights the value of the punctuated equilibrium model and shows how various theories of organization design, strategy, and information technology management can be integrated to yield insights into alignment processes.

Gerardine DeSanctis

Abstract

Several prior articles have emphasized the importance of alignment between business and information system (IS) strategies, and between business and IS structures. Seeking to advance our understanding of alignment, we examine the dynamics of changes in alignment through strategy/ structure interactions in the business and IS domains. More specifically, we address the following question: *In what ways does alignment evolve over time?*

Changes in the strategic IS management profile (which includes business strategy, IS strategy, business structure, and IS structure) over time are examined using a punctuated equilibrium model, involving long periods of relative stability, or evolutionary change, interrupted by short periods of quick and extensive, or revolutionary, change. Case studies of changes in business and IS strategies and structure over long time periods in three organizations suggest that the punctuated equilibrium model provides a valuable perspective for viewing these dynamics.

The cases suggest that a pattern of alignment may continue over a long period, because either the level of alignment is high or the managers do not recognize the low alignment as a problem. Revolutions, involving changes in most or all dimensions of the strategic IS management profile, interrupt the evolutionary changes. However, organizations hesitate to make such revolutionary changes in strategic IS management profiles. Complete revolutions apparently require a combination of strong triggers. Finally, post-revolution adjustments to one dimension of the strategic IS management profile seem to follow revolutionary changes.

(*Alignment*; *Strategic IS Management*; *Punctuated Equilibrium*; *Organizational Evolution*)

The importance of alignment for effective organizational performance is now well recognized (e.g., Delery and Doty 1996). Alignment among two or more organizational dimensions, which may be defined as the extent to which these dimensions meet theoretical norms of mutual coherence (Jarvenpaa and Ives 1993, Nadler and Tushman 1980), has been argued (e.g., Schoonhoven 1981; Van de Ven and Drazin 1985) and empirically found (e.g., Miller 1992) to enhance performance. However, despite the recognition of the importance of alignment, there has been little research on the dynamics of alignment.

With a few exceptions (e.g., Brown and Magill 1998), the literature on alignment treats it as a static end-state. However, Thompson (1967, p. 234) views alignment as

1047-7039/01/1202/0179/$05.00
1526-5455 electronic ISSN

"a moving target" at which organizations shoot, while Jarvenpaa and Ives (1993, p 570) suggest that it should be examined "as an emergent process." Clearly, the environment continues to change, slowly or rapidly, after alignment is achieved. If business strategy or structure is changed in response, would the other elements be altered in a synchronized fashion so as to maintain alignment, or would there be periods of low alignment until the other elements are realigned? This paper seeks to contribute to the literature on alignment by examining the following broad question: *in what ways does alignment evolve over time?* In addressing this question, our specific focus is on the strategic management of information systems (IS). However, our results should also provide insights into the dynamics of alignment in other contexts.

Much of the prior research on alignment in strategic IS management is limited in three ways. First, it has primarily taken a cross-sectional view (Henderson and Venkatraman 1992). Second, with rare exceptions (Brown 1997), it has focused on two dimensions, such as business and IS strategies (e.g., Chan et al. 1997), or business and IS structures (e.g., Fiedler et al. 1996). Finally, rather than using theory to identify, a priori, the expected alignment patterns, most prior studies empirically develop and test the "ideal" alignment patterns (e.g., Sabherwal and Kirs 1994). To address these limitations, this paper: (a) dynamically incorporates the dimensions of alignment and the relationships among them; (b) examines alignment from a holistic perspective; and (c) develops a theoretical model of alignment patterns, and then compares it over time to a selection of organizations.

We conducted three detailed case studies of longitudinal changes in alignment. The cases seem to best fit the punctuated equilibrium model (e.g., Gersick 1991, Tushman et al. 1986), albeit with some modifications. Thus, the paper integrates the literature from the areas of alignment and punctuated equilibrium, and offers some new insights into the dynamics of alignment. The rest of the paper is organized as follows. We first develop the theoretical background for the paper, and then explain the research methodology. We then describe each case and draw some conclusions from them. Finally, the paper's findings, limitations, and implications are discussed.

Theoretical Development

Alternative Approaches for Studying Strategic IS Management

The strategic IS literature contains several *universalistic theories*, which present one way of performing IS management and focus on the ways in which it can be improved. Universalistic theories provide valuable insights by focusing on an IS management approach, its contributions, and the ways in which it can be enhanced (e.g., Rackoff et al. 1985). However, universalistic theories view the same approach as useful in all situations, rather than examining multiple approaches in alternative contexts. Consequently, they do not provide a sufficiently integrative view of the various aspects of organizations, and may be more appropriate for relatively narrow domains.

In contrast, articles taking a *contingency perspective* examine the effects of environmental, organizational, and IS contexts on IS management, or the alignment between certain aspects of IS management and the corresponding aspects of business management. This stream of literature argues (King 1978, Sambamurthy and Zmud 1992), and empirically shows (Chan et al. 1997, Sabherwal and Kirs 1994), that greater alignment among dimensions from IS and/or business domains produces superior performance. Contingency models recognize the importance of alternative contexts, and thus provide a more integrative view of strategic IS management. However, they are usually static in nature, focusing on alignment at one point in time, and its short-term performance implications.

Several other theories take a more dynamic view of IS management. Nolan's (1979) stage hypothesis and other such theories (Galliers and Sutherland 1991, Hirschheim et al. 1988), may be characterized as *life-cycle theories* (Van de Ven and Poole 1995, p. 515). These theories generally assume that (a) the changes in all organizations take place along the same path (i.e., the same stages); and (b) these changes are in a "forward" direction toward a desired "end goal," such as the maturity stage in Nolan's model. These theories do not recognize the different contexts as important in determining the appropriateness of a particular model.

Strategic IS management may also be studied using the *punctuated equilibrium model*, which differs from the Darwinian model of change through gradual evolution by arguing that periods of gradual evolution are "punctuated" by sudden revolutionary periods of rapid change (Elderidge and Gould 1972, Van de Ven and Poole 1995). Some prior models in IS research may be characterized as punctuated equilibrium models (Orlikowski 1993, Porra 1996). For example, Newman and Robey (1992) model the IS development process in terms of episodes and encounters, which are similar to evolutionary and revolutionary periods, respectively. In contrast to universalistic theories, which focus on only one way of managing IS, the punctuated equilibrium model is open to alternative ways of managing IS over time. Moreover, unlike contingency theories, which implicitly assume stability, it recognizes that the long periods of stability are

separated by short periods of considerable instability. Finally, the punctuated equilibrium model differs from lifecycle theories as it neither assumes that the same stages are universally followed nor implies a "forward" direction of change toward a desired "end goal."

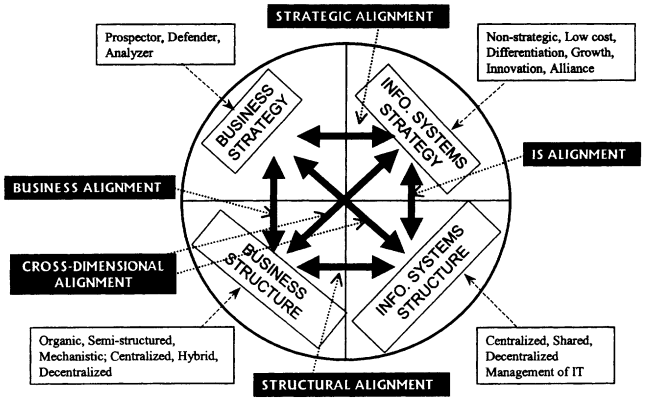
In the next subsection we draw upon prior research to develop the theoretical ideals for the strategic IS management profile. To assess alignment, an organization's actual strategic IS management profile may be compared to these theoretical ideals. The dynamics of alignment may be examined by viewing the changes in an organization's strategic IS management profile.

Strategic IS Management Profile

We view a company's IS management using its *strategic IS management profile*, including business and IS strategies, and business and IS structures, as shown in Figure 1. The strategic IS management profile resembles prior comprehensive models of IS alignment, especially Henderson and Venkatraman (1992) and Broadbent and Weill (1990). We describe the alignment between business and IS strategies as "strategic alignment" (Chan et al. 1997), between business and IS structures as "structural alignment" (Ein-Dor and Segev 1982), between business strategy and structure as "business alignment," and between IS strategy and structure as "IS alignment." Finally, following Henderson and Venkatraman, we call the alignments between: (a) business structure and IS strategy; and (b) business strategy and IS structure, "cross-dimension alignment."

The Dimensions of the Strategic IS Management Profile. Business and IS strategies and structures can each be assessed using multiple constructs. The selection of one construct to describe a dimension is never definitive. We selected the constructs based on their prominence in the prior literature and our confidence in evaluating them based on the interview transcripts.

Figure 1 Strategic Information Systems Management Profile



Business strategy may be examined using different typologies for the corporate-level strategy (i.e., which products and markets to compete in) and the business-level strategy (i.e., how to compete in a particular industry) (Beard and Dess 1981). We assessed business strategy using the popular typology of Defenders, Analyzers, and Prospectors[1] (Miles and Snow 1978, Miles et al. 1978), which combines elements of both corporate and business level strategies,[2] and has also been used in prior IS research (Brown 1997, Brown and Magill 1998, Camillus and Lederer 1985, Tavakolian 1989).

Business structure was examined in terms of the decision making being organic or mechanistic (Burns and Stalker 1961, Schoonhoven and Jelinek 1990). Based on some later work (Jelinek and Schoonhoven 1990, Brown and Eisenhardt 1997), an intermediate structure, "semistructure," was also included. Exhibiting partial order, semistructures lie between the organic and mechanistic forms. Mechanistic and organic decision-making processes may be linked to centralized and decentralized processes, respectively (Brown and Magill 1998). Therefore, we viewed business structures as being one of three: mechanistic and centralized; semistructured and hybrid (i.e., some business decisions at the corporate or central level and the others at the business unit or local level); or organic and decentralized.

IS structure was examined using a similar construct: centralized, shared, or decentralized management of IS (Brown and Magill 1994). We assessed whether the locus of responsibility for IS management decisions belongs to a corporate or a central unit (centralization), a business unit or department (decentralization), or is shared by these groups (shared) (Camillus and Lederer 1985, Tavakolian 1989). Similar measures, albeit with greater complexity and attention to differences across decision types, have been used earlier (Brown 1997, Brown and Magill 1994, 1998).

Finally, *IS strategy* was assessed by examining the ways in which IS was being sought to impact the organization. This was done using the five strategic thrusts (low cost, differentiation, growth, alliance, and innovation) identified by Rackoff et al. (1985) and used in several prior studies (e.g., Bergeron et al. 1991, Sabherwal and King 1991). Recognizing that a firm may not consider IS to be strategic (e.g., Brown and Magill 1998), we also included a sixth, "nonstrategic" category.

Theoretical Patterns of Alignment. Three of the four dimensions are assessed using three types: Prospector, Analyzer, Defender (business strategy); organic/decentralized, semistructured/hybrid, mechanistic/centralized

(business structure); and decentralized, shared, centralized (IS structure). The typology for the fourth dimension, IS strategy, includes six types. However, differentiation, growth, alliance, and innovation do not differ from each other in terms of alignment with the other dimensions. Previous research has also found it difficult to separate alliance and growth, and differentiation and innovation IS strategies (Sabherwal and King 1991). Consequently, we combine the six types into four: (a) nonstrategic IS; (b) low-cost IS strategy; (c) differentiation, growth, innovation, or alliance IS strategy; and (d) a combination of low-cost *and* differentiation/growth/innovation/alliance IS strategy. A nonstrategic IS is considered to have *low* alignment with all the business strategies and structures, while the other three IS strategies can be aligned with the three types in each of the other dimensions (Brown and Magill 1998).

Based on a careful review of the literature, as summarized in Table 1, the theoretical patterns were identified for the six types of alignment. Viewing these patterns in conjunction, we arrive at the three profiles, also shown in Table 1. When viewing alignment between any two dimensions, if they are both from the same row in Table 1 (i.e., within the same profile), alignment would be high. Alignment would be medium if the two dimensions are from consecutive rows (i.e., across Profiles 1 and 2, or across 2 and 3), and low if the two dimensions are two rows apart (i.e., across Profiles 1 and 3).[3]

Thus, some of the six types of alignment could be high, while the others are medium or low. In a similar situation, involving multiple contingencies affecting a dependent variable, Gresov (1989) examined several possibilities, three of which are important in the short term (Brown and Magill 1998): the absence of any conflict (i.e., the contingencies reinforce each other), the presence of conflict (i.e., the contingencies work at cross-purposes), and the presence of a dominant imperative (i.e., one contingency dominates the rest). We propose that the overall alignment in a strategic IS profile is based on the six types of alignment. If the number of alignments that are high exceeds those that are low, the overall alignment would be high. This is closest to Gresov's "no conflict" situation. If the number of alignments that are high is less than those that are low, the overall alignment would be low. This is closest to Gresov's "conflict" situation. Finally, if the number of alignments that are high equals the number of alignments that are low, the overall alignment would be medium. This lies between Gresov's "no conflict" and "conflict" situations. It may be noted that we considered all six types of alignment as equally important, and therefore did not pursue Gresov's "dominant imperative."[4]

The Dynamics of Alignment

Even after an organization has achieved alignment, its environment continues to change, slowly or rapidly. However, organizations may not be able to adjust their alignment patterns to accommodate environmental changes, due to two major reasons. First, an overemphasis on alignment could constrict the organization's outlook, inhibiting the recognition of alternative perspectives and reducing the ability to "recognize and respond to the need for change" (Miller 1996, p. 510). The second reason focuses on complacency and inertia. Alignment facilitates short-term success, which leads to inertia, and the inertia in turn leads to failure when the market conditions shift suddenly (Tushman and O'Reilly 1996). Therefore, when organizations with a high level of alignment face sudden changes in industry conditions, they may find it necessary to make revolutionary changes (Greenwood and Hinings 1996).

The punctuated equilibrium model is a potentially useful way of examining the dynamics of alignment. One key component of the punctuated equilibrium model is a deep structure, or "the set of fundamental choices a system has made of (1) the basic parts into which the units will be organized and (2) the basic activity patterns that will maintain its existence" (Gersick 1991, p. 14). Other key components of the punctuated equilibrium model are evolutionary periods during which the deep structures undergo little change, and revolutionary periods during which the deep structures are completely transformed. In the context of long-term changes in alignment, we propose that the strategic IS management profile represents the "deep structure." It reflects the organization's basic choices in terms of strategies and structural arrangements, in business and IS domains. Then, based on the punctuated equilibrium model, evolutionary changes would not have much effect on the strategic IS profile. Consistent with the earlier arguments, a high level of alignment may lead to inertia, necessitating revolutions, involving complete transformation of the strategic IS profile.

Evolutionary and revolutionary changes may also be understood using the two long-term possibilities identified by Gresov (1989). In the context of the strategic IS management profile, the conflict implied by low alignment may be resolved in the long run either by redesign or without redesign. Resolution by redesign, wherein the contingency factors are changed significantly to reduce the conflict among them, reflects revolutionary changes. In contrast, resolution without redesign, wherein actors reinterpret the contingency factors such that conflict disappears, characterizes evolutionary change.

Table 1 Theory-Based Ideal Alignment Patterns

Type of Alignment		Dimension 1	Dimension 2	Supporting References
Business Alignment		**Business Strategy**	**Business Structure**	
	#1	Defender	Mechanistic, Centralized	Miles et al. 1978, Miles and Snow 1978, 1996; Jelinek and Schoonhoven 1990; Das et al. 1991.
	#2	Analyzer	Mechanistic, Centralized Semistructured,	
	#3	Prospector	Hybrid Organic, Decentralized	
Strategic Alignment		**Business Strategy**	**IS Strategy**[a]	
	#1	Defender	Low Cost	Camillus and Lederer 1985, Segev 1989.
	#2	Analyzer	Low Cost AND Differentiation/Growth/ Alliance/Innovation	
	#3	Prospector	Differentiation/Growth/Alliance/Innovation	
Structural Alignment		**Business Structure**	**IS Structure**	
	#1	Mechanistic, Centralized	Centralized	Ein-Dor and Segev 1982, Jelinek and Schoonhoven 1990, Brown 1997.
	#2	Semistructured, Hybrid	Shared	
	#3	Organic, Decentralized	Decentralized	
IS Alignment		**IS Structure**	**IS Strategy**	
	#1	Centralized	Low Cost, Nonstrategic[b]	Camillus and Lederer 1985, Jelinek and Schoonhoven 1990, Brown 1997.
	#2	Shared	Low Cost AND Differentiation/Growth/ Alliance/Innovation	
	#3	Decentralized	Differentiation/Growth/Alliance/Innovation	
Cross-Dimensional Alignment 1		**Business Structure**	**IS Strategy**[c]	
	#1	Mechanistic, Centralized	Low Cost	Camillus and Lederer 1985, Brown 1997, Brown and Magill 1998.
	#2	Semistructured, Hybrid	Low Cost AND Differentiation/Growth/ Alliance/Innovation	
	#3	Organic, Decentralized	Differentiation/Growth/Alliance/Innovation	
Cross-Dimensional Alignment 2		**Business Strategy**	**IS Structure**	
	#1	Defender	Centralized	Camillus and Lederer 1985, Tavakolian 1989, Das et al. 1991.
	#2	Analyzer	Shared	
	#3	Prospector	Decentralized	

[a]"Nonstrategic" IS would have LOW alignment with any of the three business strategies.
[b]The relationship of nonstrategic IS with centralized IS structure is based specifically on Brown and Magill (1998).
[c]"Nonstrategic" IS would have LOW alignment with any of the three business structures.

Based on the above characteristics of evolutionary and revolutionary changes, we considered a *revolutionary change* in the strategic IS management profile to be one involving a categorical (i.e., from one type to another, such as from Prospector to Analyzer business strategy) change in three or more dimensions. We also distinguished between *complete revolutions*, wherein all four dimensions of the profile were changed in the same period, and *incomplete revolutions*, wherein only three dimensions were changed concurrently. *Evolutionary changes* were those involving only minor modifications (i.e., not representing a shift to another type, such as continuing to pursue a Prospector business strategy but doing so in a different fashion) along one or more dimensions.

Finally, during the analysis of the case studies, we observed another kind of change, which we call *post-revolutionary changes*. These involve categorical changes in one of the four dimensions of the strategic IS management profile.

In summary, to pursue its goal of examining the dynamics of alignment, this paper draws upon the punctuated equilibrium model. It uses an organization's strategic IS profile as the deep structure that undergoes changes over time. Consequently, changes occur in six types of alignment that together reflect overall alignment. The paper examines whether these changes occur over time in an alternately evolutionary and revolutionary fashion as suggested by the punctuated equilibrium model.

Research Methodology

To explore this supposition, we conducted multiple case studies. A qualitative approach was chosen due to the lack of prior research on dynamics of alignment, the desire to understand the strategic IS management profiles within the rich organizational contexts, and the sensitive nature of the data needed (Yin 1984). Moreover, the focus of the study was on the events associated with changes in alignment over time. In order to understand the thought processes underlying major decisions made along the way, it was essential to incorporate the perspectives of senior business and IS executives. At the same time, in order to achieve some understanding of the different aspects of the changes in alignment, we wanted to examine them in multiple cases. Three detailed case studies were conducted.

The case sites were selected based on a combination of accessibility (to senior business and IS executives), interestingness (in the issues causing senior executives to reconsider the role and strategy of the IS organization), and cross-case diversity (in company size, industry, and issues). We use the pseudonyms[5] ENERGY, DIVFIN, and LEASE to represent the three companies. ENERGY and DIVFIN are large companies, whereas LEASE is small. ENERGY is international, with significant presence in the United States, LEASE is located in United States, and DIVFIN is Australian. One major subsidiary of ENERGY, which we call SUBSID, provides consulting and IS services to external organizations as well as other subsidiaries of ENERGY. ENERGY's IS group was a major portion of this subsidiary.

Data Collection

Each case examined changes in both business and IS strategies and structures over extended time periods. The events were studied retrospectively through intensive, nondirective interviews with the executives involved in strategic IS management. We asked the informants to focus on specific critical events, but encouraged them to expand their comments into areas of personal interest concerning their company's strategic business and IS conditions. More vivid events were of special interest. Each interview was tape-recorded, with additional notes being taken when necessary and then transcribed.

In an effort to address the potential limitations of examining time-consuming phenomena through retrospective interviews, we interviewed multiple informants from different backgrounds and at varying hierarchical levels. This, along with the examination of internal company documents, provided multiple perspectives on the strategic IS profile and enabled cross-checking of the perceived relationships among its four dimensions. The interviews at LEASE were conducted during January–February 1996. DIVFIN was visited twice, while ENERGY was visited thrice. Most of the interviews were conducted during the first visit—in April 1996 at DIVFIN and in February–April 1996 at ENERGY. Later events were studied through follow-up visits—in July 1997 at DIVFIN and in June–July 1997 and April 1998 at ENERGY. A total 47 hours of interviews were conducted. We conducted five interviews at LEASE, with the chief financial officer (CFO), senior VP (Operations), VP (Accounting), VP (Marketing), and the former IS director. At DIVFIN, we conducted nine interviews with seven individuals: corporate CFO, corporate CIO, IT manager (later promoted to CIO), new IT manager (who joined after outsourcing arrangement began), IT directors for financial services and property services, and IT project manager (who reports to IT director for property services). Finally, at ENERGY, we conducted 16 interviews with 13 executives, including the president and CEO of SUBSID, six of the nine individuals (including customer support managers) who directly report to SUBSID's CEO (one of these individuals is now the CEO), and six IT line of business managers.

Data Analysis

At each company, we examined the way in which the strategic IS management profile changed over time, through rigorous analysis of extensive interview transcripts and company documentation. Being based on three cases, our results may seem particularistic. However, we tried to produce more general explanations (Eisenhardt 1989) through "analytic generalization" (Yin 1984), where "the generalization is of theoretical concepts and patterns" (Orlikowski 1993, p. 310). The concepts and patterns were linked to the existing theory on punctuated equilibrium models and on alignment in

strategic IS management. A four-step process was followed, as described below.

Step 1—Initial Analysis of Transcripts. Each transcript was read carefully, and the informants' descriptions of, and explanations for, the various events were highlighted. The interviewee comments were also linked to business and IS strategies and structures, and to the relationship between two or more of these dimensions. Using this understanding of the processes through which the strategic IS management profiles evolved, we sought to identify a process theory (Van de Ven and Poole 1995) best representing each case. In each case, the alternately slow and rapid pace of changes seemed to best conform to the punctuated equilibrium model. The periods of major change, and the intervening periods of relatively little change, were also identified in this step, and then subjected to a more rigorous analysis.

Step 2—Formal Interpretation of Transcripts. The case transcripts were analyzed in a more structured fashion in this step. Each case was assigned to two authors, so that each of the three authors independently read the transcripts for two of the cases. This allowed the incorporation of two different perspectives for each case and minimized the likelihood that we missed something important.

In order to facilitate consistent interpretation, the three authors used a common set of brief definitions of the various business and IS strategies. We used a common electronic form to analyze transcripts, and moved interview comments to this form through "copy" and "paste" commands. The perceived nature of each comment was also indicated on this electronic form. The comment could concern one or more dimensions of the strategic IS profile (e.g., "Move towards a centralized IS structure"), IS or business performance, a factor that may have triggered a major change, an important change in personnel, or some other potentially important aspect. The form also indicated the location of each comment on the transcript, the approximate date to which it was relevant, and any links to other comments. Thus, this step helped segment interview data into meaningful pieces of text (Tesch 1990).

Step 3—Analysis of the Formal Interpretations. Next, the electronic forms containing the assessments of the two raters for all the transcripts for each case were combined in an electronic spreadsheet. The spreadsheets were quite large, with the smallest one (for LEASE) having 310 rows. Each spreadsheet was sorted based on the nature of, and the time period relevant to, each comment.

Together, Steps 2 and 3 helped us to decontextualize the interviewee comments out of their original context, and then recontextualize them (i.e., assemble all the comments in a case about a particular aspect) (Tesch 1990). The three sorted spreadsheets were used to identify the business and IS strategies and structures, the factors affecting them, and the changes in business and IS performance. Within each case, the strategic IS profiles at various times were viewed in the light of the ideal alignment patterns (see Table 1) to assess the six types of alignment. The changes in the four strategic dimensions were used to classify the overall change as evolutionary or revolutionary.

Step 4—Cross-Case Analysis. While similar in the applicability of the punctuated equilibrium model to them, the three cases differed in several ways. Comparison of changes in strategic IS management profiles across the three cases, and the factors triggering the changes, revealed some patterns that generally conform to the punctuated equilibrium model. The results also include a few departures from the prior literature, which should be examined in future research.

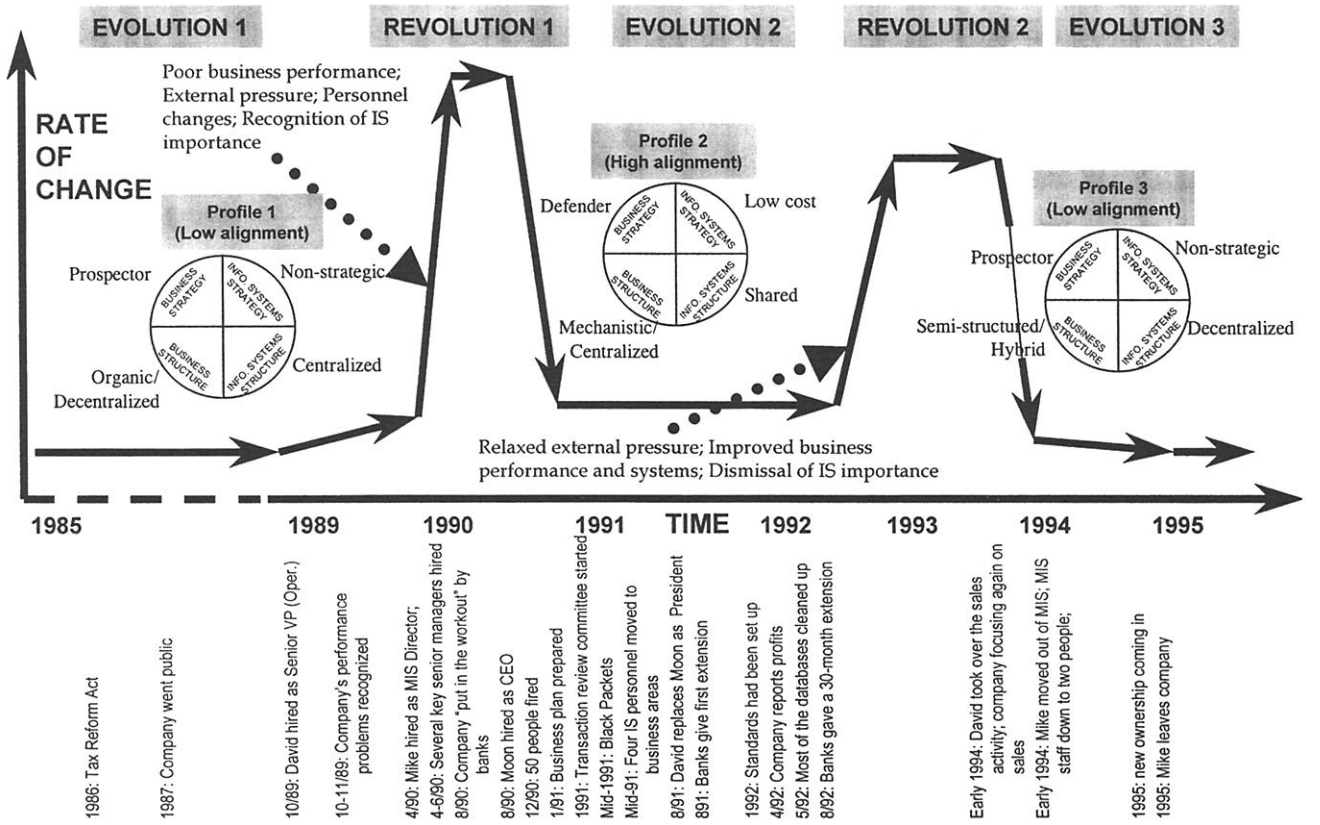
Descriptions of Cases

Case Study 1: LEASE

Started in 1976 as an equipment sales company, LEASE became an independent equipment lessor in 1983. The case covers the period from 1986 until early 1996, during which time its net worth grew from $25 million[6] to $100 million, and the number of employees ranged from 90 to 275. As shown in Figure 2, we examined two revolutions that occurred in 1990 and 1993, and three evolutionary changes: before the first revolution, between the two revolutions, and following the second revolution.

Evolutionary Period 1. From the time of its creation, LEASE pursued a *Prospector* business strategy. Comprised of about two-thirds operating lease and about one-third direct finance lease, it grew quickly by aggressively pursuing a number of products. However, it operated with an *organic and decentralized* business structure, with few standards and minimal concern for proper records. The functional areas operated as "little fiefdoms" (chief financial officer, or CFO) with no central control. LEASE had little information it could use for planning and control. Also, as it was not affiliated with a bank, it faced few external controls. In its desire to grow quickly, LEASE had paid little attention to systems. It had a small, centralized IS staff which was isolated from the business functions. Thus, a perception of IS as *nonstrategic* was accompanied by a *centralized* IS management structure.

Figure 2 Evolutionary and Revolutionary Periods at LEASE



When the 1986 Tax Reform Act was passed, certain tax benefits applicable to the leasing business were repealed. As a result, "the buyers that formerly bought those deals from us no longer had an appetite" (CFO) for those previously more profitable arrangements. However, LEASE continued to conduct business as if the environment was the same as before. It also failed to recognize the sharp decline in mainframe computer prices due to the ascent of personal computers.[7] Unaware of the problems lying ahead, LEASE went public in 1987. In October 1989, David Garcey was hired as senior vice president (VP) (Operations) as the company started recognizing it was in trouble.

Revolutionary Period 1. Following the entrepreneurs' recognition of LEASE's financial troubles, things moved quickly. Several senior executives, mainly from Garcey's previous company, were hired in April–June 1990. In 1990, LEASE had a debt of $100 million for equity of $60 million, and as it incurred further losses, the debt/equity ratio quickly rose to about three. In August 1990, LEASE was "put in the workout" (VP, Accounting) by its lender banks. It now had to do monthly compliance reports. Recognizing the seriousness of the situation, the entrepreneurs hired Rick Moon, a banker, as CEO. The former IS director characterized this as "fighting bankers with a banker."

Soon after the new CEO arrived, the business strategy shifted to *Defender*. LEASE stopped growing and started cutting costs. In January 1991, a business plan was prepared. A few months later, a transaction review committee[8] was created to monitor all the sales deals. The CEO primarily concentrated on cutting costs, firing 50 people in December 1990 and another 20 a little later. Senior executives believed that Moon had a plan to cut costs, but lacked a plan to get the company back on track once costs were cut. In August 1991, the Board decided not to renew Moon's contract, and named David Garcey as president instead. An interviewee attributed this move partly to the banks' greater confidence in his abilities than in Rick Moon's. Garcey quickly centralized the business structure, instituted clear lines of reporting, and assumed a significant role in all major decisions.

The changes in top management, strategy, and structure on the business side were accompanied by major changes in IS. Moon and Garcey recognized the strategic role IS

would play in *cutting costs*, especially in accounting. Moon hired Mike Adrian as IS director. When Adrian joined LEASE as IS director, it had 14 people in IS. He shifted the previously centralized IS management to a more *shared* form, moving four IS employees to the user areas. They participated in meetings with others in their area, played a major role in local IS decisions, and communicated weekly with Adrian.

Evolutionary Period 2. In August 1991, the banks gave LEASE an extension. They had greater confidence in LEASE as several *mechanistic* controls, including a monthly flash report to management, were established. The transaction review committee met daily and approved all bids, credits, and major sales. LEASE also started a process called "black packets"[9] to closely scrutinize each deal. For several months, employees worked hard examining the previous deals, setting standards, and cleaning databases. They frequently discovered new problems. The senior VP (Operations) remarked: "It seemed like every time you asked a question, you turned a rock over and there was a bunch more ugliness underneath the rock." Detailed standards had been set up by early 1992, and by May 1992 most of the databases had been cleaned up. In April 1992 LEASE reported profits, which led to banks granting it a 30-month extension, and allowing it to keep a certain formula amount of cash flows to invest in new business. This was a major landmark, as it allowed LEASE to generate new business, thereby garnering additional income and providing for future cash flows.

Revolutionary Period 2. Following the turnaround, LEASE made major changes in business and IS strategies and structures. In addition to the traditional leasing of computer equipment, it began leasing other kinds of equipment (e.g., forklifts and trucks) as well. The common belief was that the back office had been taken care of, and now the front office needed to be focused on. David Garcey brought sales under his direct control in 1994, and emphasized the need to increase sales.

With the business strategy reverting back to Prospector, the lack of attention to mechanistic controls seemed to reemerge as well. Clear reporting structures and well-defined roles were being blurred, with people being rotated frequently across departments and tasks. The business structure had shifted toward a *semistructured and hybrid* form. The importance of IS was reduced again. Mike Adrian left the IS group, but continued on at LEASE, becoming "quasi-advisory" to IS. The IS structure was in flux. Central IS staff, which had been trimmed toward the end of 1992, was now down to two people, with the individual departments assuming responsibility for various information technology (IT) functions. Vendors were hired for IS maintenance, and the IS budget was reduced to $300,000. Another individual took over as head of IS, but unlike Mike Adrian, was not given the title of IS director. Having made a strategic contribution to the corporate turnaround, IS was now nonstrategic again.

Evolutionary Period 3. After these major changes, LEASE entered another period of minimal change. It sought to gradually build sales to enhance profitability. Adrian disagreed with some of the ongoing changes, and in late 1995, decided to leave LEASE. With only two individuals in the central IS group, and no one having the title of IS director, IS management became decentralized. Some senior executives were afraid that this reduced role of IS would come back to haunt them in the future.

Conclusions. The strategic IS management profile during Evolution 1 had high business and IS alignments. But the other types of alignment were low, and so the overall alignment was low as well. LEASE seemed to resolve the conflict in the alignment profile without redesign; convincing themselves that IS was not important due to the rapid growth, its managers focused on hiring salespersons and closing deals quickly without building essential systems. The business performance was good in the short term, but the long-term performance suffered, and LEASE ended up close to bankruptcy.

Revolution 1 was triggered by several factors, including the shift in the environment (changing tax laws, computer industry economics) and LEASE's inability to respond to it via evolution, deteriorating business performance, changes in top management (including two quick changes in CEO and the hiring of the first and last CIO), and the recognition of the importance of IS. LEASE underwent changes in all four dimensions of its strategic IS profile. Consequently, the overall alignment increased, with three of the six alignment measures being high and the other three being medium. The increased alignment apparently improved both business and IS performance. LEASE seemed to have finally succeeded in resolving the conflict in its alignment profile by redesigning the four dimensions.

Unfortunately, once the performance improved and the banks relaxed their controls, LEASE quickly underwent another revolution, reverting in three of the four dimensions to the strategic IS management profile before the first revolution. The importance of IS was dismissed again, the position of CIO was discontinued, the IS staff was drastically reduced, and the focus on sales without systems and controls resurfaced. Only one of the six alignments (IS structure-business strategy) was high, with

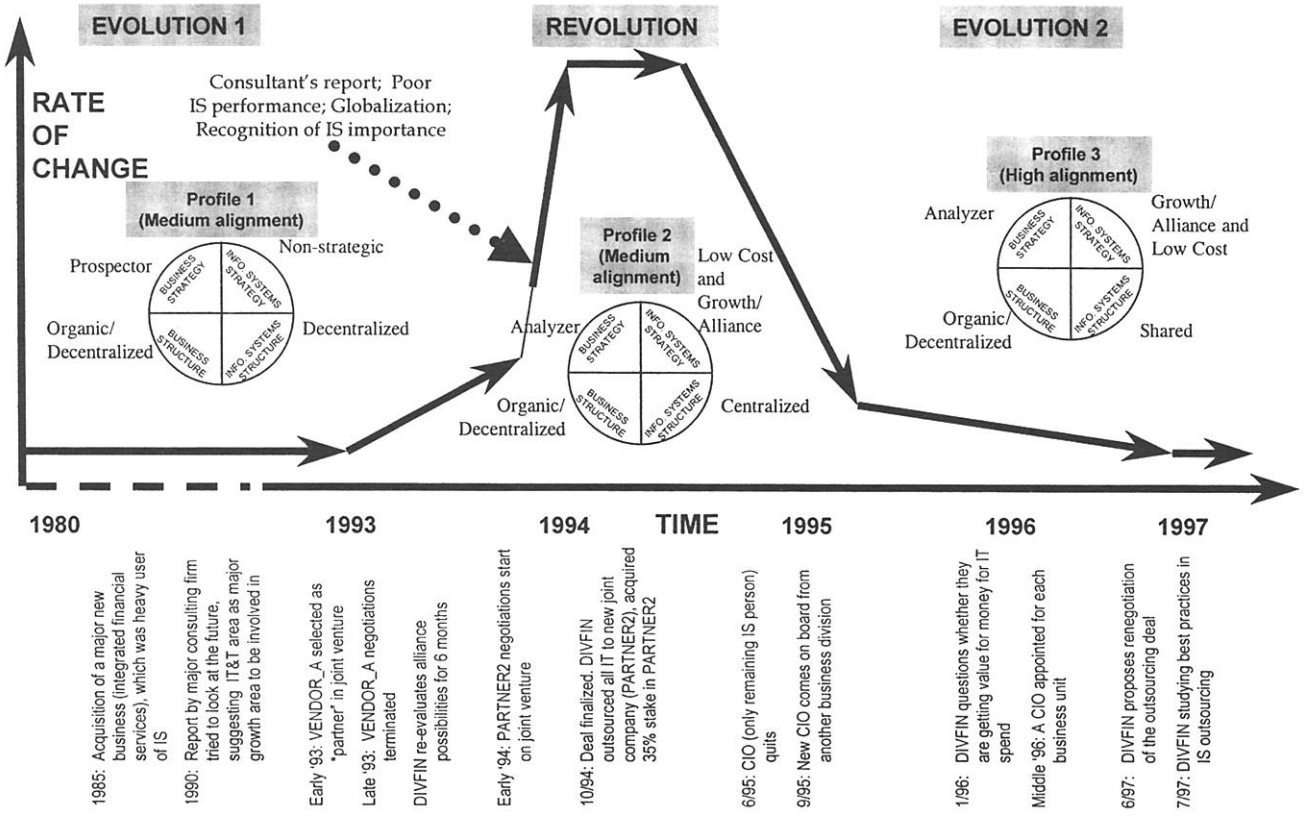
another two (business, structural) being medium, and the rest being low. The conflict within the strategic IS management profile had thus reemerged, and the overall alignment was again low. Although the company was still performing well, concerns were expressed about its long-term future.

Case Study 2: DIVFIN

DIVFIN is a diversified Australian company with annual revenue of about two billion dollars and after-tax profits of over $250 million. Its businesses include financial services, property services, capital services and investments, and group services. This case focused on a revolutionary change in which DIVFIN outsourced all its IS activities to a multinational IS vendor and obtained a 35 percent stake in the vendor's Australian unit. The case description is in terms of three periods: the revolutionary period (February 1994 to June 1995), and the evolutionary periods before and after this revolution.

Evolutionary Period 1. As shown in Figure 3, DIVFIN grew considerably from 1980 to 1993. Pursuing a Prospector business strategy, it grew by getting into new areas, partly through external acquisitions. One major acquisition was of a large integrated financial services firm in 1985. Consistent with its growth by acquisition, DIVFIN included several companies managed in a decentralized and organic fashion. Characterized by a high level of entrepreneurship, DIVFIN was managed in an ad hoc fashion with few controls. IS management was highly decentralized, aiming to support the internal operations of the different companies within DIVFIN. Each business unit of DIVFIN had a separate IS unit. The business units differed vastly in the technologies used, probably due to historic differences, especially between financial and property divisions. However, IS was playing a nonstrategic role at DIVFIN. IS activities were driven by "the techies," according to a senior business executive, with little direction from the business side. Although the total money invested on IS was tightly maintained, there was a lack of control on specific activities. According to the IS executives we interviewed, the IS resources were used

Figure 3 Evolutionary and Revolutionary Periods at DIVFIN



inappropriately, with too much expenditure on maintaining old systems.

In 1990, the CEO (Steve Avery) engaged a large consulting firm to catalog areas for future growth for DIVFIN. The consulting firm highlighted the importance of the IT industry, including the possibility of some form of joint venture. This focused attention on IS, which according to one senior IS executive "had been historically much underfinanced."

Revolutionary Period. The revolutionary change began with the CEO and the other senior managers mandating a 35 to 40 percent expense reduction to allow for greater global competitiveness, especially as several international companies were moving into Australia. This caused a shift to an *Analyzer* strategy as DIVFIN searched for ways to simultaneously accomplish global competitiveness, drastic reduction in business expenses, and entry into the high-growth IS industry. The CEO sought to acquire a stake in the IS industry through an alliance with a major IS provider rather than purchasing an IS company. Moreover, outsourcing was expected to transform the management of IS. IS now became strategic to: (a) generating external revenues through stake in an IS company; and (b) significantly reducing business costs. Thus, IS strategy was to simultaneously seek *low cost and growth/alliance.*

In early 1993, DIVFIN initiated negotiations with a global IS vendor, but these discussions were severed in late 1993 due to disagreements on the structure of the joint venture. Six months later, another global IS vendor which was trying to enter the Australian market approached DIVFIN about the prospect of a joint venture. Having in part built its business on similar alliances in financial services and property development industries, DIVFIN found such an arrangement to be attractive. As part of the agreement, DIVFIN would outsource all of its IS to a new Australian company, in which it would have a 35 percent stake, with the global IS vendor having the other 65 percent stake. The contract was consistent with DIVFIN's past in some aspects, including the lack of controls, clear plans, or service-level agreements. It also reflected the company's past in that the focus was mainly on the external component of the alliance with the details of the internal management of the IS function being ignored. However, the contract represented a shift in other ways. One change was that the decisions were made largely by the corporate CEO and CIO, and the historically independent business units had little say in the matter. This change in decision-making locus later caused problems in establishing realistic and meaningful service-level agreements. The joint venture company went online on October 1, 1994.

Evolutionary Period 2. Inadequate definition of service levels was exacerbated by the apparent belief that by outsourcing IS, IS management had been outsourced as well. DIVFIN failed to place appropriate control mechanisms to monitor and administer the contract. Some individuals from the vendor acted as liaisons to translate and handle user needs, but they were not effective in coordinating and controlling the relationship. In transitioning DIVFIN's IS personnel to the vendor, only the former IS director of financial services was retained, and he left in June 1995. There was really no one from DIVFIN to handle IS from June 1995 to October 1995 when a corporate CIO, with the responsibility for managing the contract, was hired. This centralized IS management was a major departure from history.

Initially, there were several problems in the relationship with the vendor. They were attributed to inadequate management by DIVFIN, unrealistic expectations, and cultural differences. In sharp contrast to DIVFIN's laissez faire culture, the vendor was a machine bureaucracy. Some interviewees also viewed it as inadequately customer-oriented. Over time, DIVFIN has recognized the need to manage the contract better. IS management is now *shared* by DIVFIN and the business units,[10] with each unit now having its own CIO and its own people responsible for managing its part of the vendor contract.

The problem, however, is the contract, especially how to take the user requirements and fit them into the overall structure of the contract. DIVFIN had assumed that due to the nature of the alliance, the vendor would readily provide needed services whether or not they were identified in the original scope. As outsourcing vendors do not accept such interpretations, it is not surprising that the conflict continues. The vendor does want to deliver a high-quality service, but because the contract was poorly defined, and the business units' needs poorly understood, neither party is satisfied. This has led DIVFIN to seek to renegotiate the contract. The vendor is lukewarm to the overture. Seeing no point in rejecting such discussions outright, however, it has been arguing that the renegotiations would have to benefit both parties.

When we last visited DIVFIN (in July 1997), one of the newly appointed CIO's considered the IS outsourcing situation (in terms of the relationship between DIVFIN and the new company) to be getting better, but the overall service performance to be "pretty ordinary." While there has been a modest improvement in the vendor's service, "there is still a long way to go." One of DIVFIN's new IS managers also raised a concern about the increased external dependence. As there is no longer an internal IS group, DIVFIN's business units have no alternatives.

Worse, he was worried about how the business unit managers will acquire the necessary understanding of IT to succeed in the future.

Conclusions. During Evolution 1, three types of alignment were high while the other three were low. Thus, the overall alignment was considered medium. All three misalignments concerned IS strategy, which is interesting considering that IS performance was criticized by most interviewees. In contrast, the three alignments among the other three dimensions (business strategy, business structure, and IS structure) were all high. The high levels of these types of alignment, especially business alignment, may be related to DIVFIN's good short-term and long-term business performance.

A consultant's report, combined with the increased recognition of the importance of IS and the need to cut costs due to increasing global competition, led to the revolutionary changes. The revolution was incomplete, as only three of the four dimensions of the strategic IS management profile (all except business structure) were changed. All six types of alignment changed somewhat, but the overall alignment remained medium. Structural alignment became low as IS management was centralized at the corporate level in sharp contrast to the highly decentralized business structure.

Following the revolution, DIVFIN underwent considerable changes in one dimension—IS structure. CIO's were hired for each strategic business unit, and some of the vendor's service-level agreements were moved from the corporate level to the business-unit level. These changes somewhat offset the change made in the revolution by moving the IS structure back to shared, which was between the earlier decentralized and the post-revolution centralized forms. These post-revolution changes increased structural alignment and increased the overall alignment to high. Thus, DIVFIN followed the incomplete revolution with post-revolution changes to further improve alignment. The IS performance problems were reduced as a result, and there seemed to be greater confidence about the future.

Case Study 3: ENERGY

ENERGY is the United States subsidiary of an international organization performing the exploration, production, refining, and marketing of petroleum products. In 1995, its revenues exceeded $20 billion, with a net income of over one billion dollars, and over 15,000 employees. As shown in Figure 4, we describe the case in terms of a revolutionary change (April 1993 to September 1995) in which ENERGY was restructured and several independent subsidiaries (including one with a considerable focus on IS) were formed, and the evolutionary periods preceding and following it.

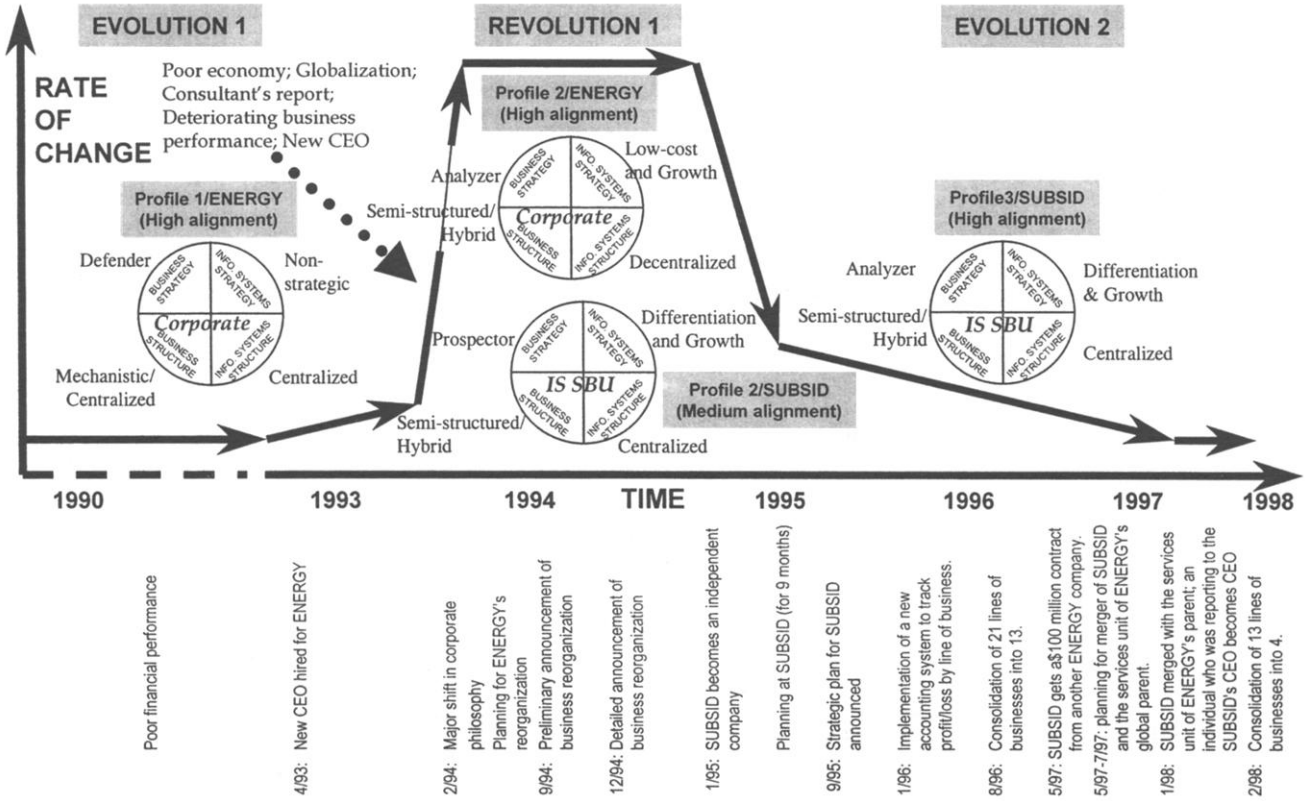
Evolutionary Period 1. Until 1993, ENERGY had been operating in a stable fashion, with little change in strategic orientation, organization structure, or corporate philosophy. It was historically very successful. It had been following a Defender strategy, maintaining its territory through low costs but not seeking opportunities for growth. However, the energy industry was becoming increasingly competitive, partly due to protracted low price of crude oil and natural gas in the late 1980s and early 1990s. Projected future prices also showed no significant increase. ENERGY had a mechanistic and centralized structure based on what several interviewees called a "command and control" model. As with other Defenders (Delery and Doty 1996), there was an unwritten contract with the employees. They were expected to be loyal and work hard, while ENERGY promised a good salary, excellent benefits, and lifetime employment. However, the employees were constrained, or as one interviewee put it, "mushroom capped"—that is, ENERGY exerted a paternalistic control over the employees, managing the employees' careers for them in terms of job assignments, training, and advancement.

During this period, IS management was highly centralized, with a central IS group serving the various business areas. The IS group played a nonstrategic role, supporting the business areas but doing so from a technological focus rather than a business-oriented one. They were perceived as telling business people how to do things rather than listening to their needs.

Revolutionary Period. The primary risk with a Defender business strategy is the inability to respond to major market shifts (Miles et al. 1978). ENERGY also suffered from this problem. It had a tendency to reinvent the wheel,[11] and also failed to respond to increasing competition. Continued success had seemingly led to a complacent, inward-looking, and inflexible corporate culture. ENERGY's financial performance in the early 1990s was therefore disappointing relative to other energy firms.

A new president and CEO, Paul Hill, was hired in April 1993. He discarded traditional solutions to ENERGY's problems, insisting instead on a corporate transformation. He commissioned a thorough evaluation of the company's mission, structure, and direction. The company's business strategy shifted toward Analyzer with greater attention to the market conditions and efforts to identify growth opportunities. In February 1994, Hill and four executive vice presidents mandated a major shift in corporate philosophy from a centralized "command and control" structure, which was considered unsuitable for rapid

Figure 4 Evolutionary and Revolutionary Periods at ENERGY



market changes, to what they called "federal governance" (a customer support manager).[12] Shifting the business structure toward a *semistructured and hybrid* form, decisions were moved to the lowest hierarchical level at which the necessary information was available. ENERGY departed from a de facto policy of life-long employment toward transient employment.[13]

On January 1, 1995, each subsidiary became an independent entity with individual profit and loss responsibility. Top management of ENERGY was performed by a leadership council, and a larger leadership group which included senior executives from the various subsidiaries. Similarly, each subsidiary's leadership group and council included one or more representatives from ENERGY.

One of the subsidiaries, SUBSID, employed about 1,800 people, including approximately 800 in the IS group.[14] Its mission was to provide a variety of corporate services, including IS, not only to ENERGY subsidiaries, but also on the open market to other organizations not related to ENERGY (including other firms in the energy industry). SUBSID had an existing revenue base in excess of $300 million, mainly from other ENERGY subsidiaries. Its board included the CEO and three other senior executives from ENERGY, but not the heads of the other business units (to avoid conflict of interest). Moreover, SUBSID's CEO was one of the 14 members of ENERGY's leadership council. SUBSID's corporate siblings were free to look outside for IS services. IS accountability and decision making were pushed into the business units, and a CIO was appointed for each unit. The IS management structure for ENERGY was thus decentralized. The shift in IS structure was accompanied by increased recognition of the importance of IS, and a shift toward a combination of *low-cost and growth* IS strategy. ENERGY was seeking to reduce business and IS costs through efficiencies expected from market competition. In addition, it expected external revenue from SUBSID. SUBSID's corporate siblings continued to have some influence on SUBSID as its valued customers, as well as through ENERGY's top executives who were members of SUBSID's board.

Evolutionary Period 2. Following the major upheaval, the subsidiaries settled down to fine-tune internal structures and strategies. SUBSID's senior executives spent nine months assessing strengths, weaknesses, market, and

competition, completing the strategic plan in September 1995. SUBSID initially started with a *Prospector* strategy, seeking to get external business in a creative fashion. It sought business not only from IS development but also from selling surplus IS capacity and IS-related infrastructure. Its internal information systems, and superior IS skills, including advantages in subsurface information technology and infrastructure processing, were seen as potentially key in *differentiating* SUBSID from its competitors and enabling *growth* of its business. The September 1995 strategic plan led to a change in SUBSID's structure, from centralized cost-centers to a matrix structure including 21 lines of businesses. The semi-structured/hybrid business structure was aligned with SUBSID's new Prospector business strategy, emphasizing revenue growth and customer satisfaction.

SUBSID created the position of manager (Business Development) to pursue external contracts, made a customer support manager responsible for each of the ENERGY customers, and appointed a CIO for its internal systems. IS management within SUBSID was done in a centralized fashion by the CIO, who was responsible for deciding about the systems to be used by SUBSID's lines of businesses. The internal systems were also generally centralized.

SUBSID's strengths included industry knowledge and the ability to do oil and gas accounting at about half the industry cost. However, several factors offset these strengths. SUBSID was now competing for both existing and new business with large competitors, possessing strong deal-making and relationship-building skills, eager to get a foothold in the energy industry. Therefore, SUBSID started hiring commissioned salespersons for the first time in company history. However, established attitudes at SUBSID posed another problem; its personnel had to make a transition from viewing their ENERGY customers as a captive audience to treating them as free-market customers. Finally, SUBSID had no track record in the external market, and no list of references. The other major energy companies would also hesitate to do business with SUBSID due to the fear that this may help a competitor (i.e., ENERGY) through additional revenues and potential access to sensitive data.

Free to go elsewhere for IS services, ENERGY's other business units started investigating such possibilities. Based on the confidence that it could be very competitive with other service providers, at least in the energy industry, SUBSID viewed this as both an obstacle and an opportunity. The search for an external vendor led to a better appreciation of the value of SUBSID, and also enhanced SUBSID's credibility with other subsidiaries of ENERGY. Their assessments of SUBSID's performance improved as well, going up by five percentage points in 1997 in terms of overall satisfaction level.

The obstacles encountered in seeking external contracts, along with the difficulties other subsidiaries of ENERGY faced when they sought external vendors, led to a shift in SUBSID's strategy toward Analyzer. Instead of pursuing a Prospector strategy through increased external business, SUBSID now focused mainly on internal (within ENERGY or within its global parent company) customers. To pursue external opportunities, it decided to look for a strategic alliance with an IS vendor. Moreover, rather than trying to provide all kinds of IS-related solutions, SUBSID focused on systems development and delivery. In May 1997, SUBSID obtained a $100 million project from another ENERGY subsidiary. SUBSID was conducting this project along with an external vendor. In addition to the business from the ENERGY companies, SUBSID obtained several external projects, ranging from $100,000 to over five million dollars. Its revenues for 1996 were about $350 million, and $430 million in 1997.

When we last visited SUBSID in April 1998, it had continued its postrevolutionary changes along three basic lines. The biggest change had been the merger of SUBSID, based in United States, with other similar subsidiaries of ENERGY's global parent to form a single IS and business services subsidiary supporting all the business units of the global company. SUBSID was still pursuing an Analyzer business strategy, although its market focus had continued to shift somewhat from providing services to the general energy industry towards gaining a larger share of ENERGY's parent company's business. While SUBSID would continue to seek new opportunities outside its global parent, it planned to be less aggressive until it had explored all the internal opportunities for new business.

The second post-revolutionary change involved further consolidation of SUBSID's lines of business, first from 21 to 13 and then to four. The organizational structure continued to be semistructured/hybrid but had evolved into a three-dimensional matrix based on SUBSID lines of business, geographical regions, and the business units of ENERGY's global parent.

The third postrevolutionary initiative was a continuation of the search for acquiring new business skills related to marketing and relationship management, but with a slight twist. Although SUBSID was still hiring individuals with specific expertise in these areas, it was also exploring potential strategic partnerships to enhance its competencies and market attractiveness. For example, it was discussing a possible joint venture or partnership with a consulting firm for a wide range of services to the

energy industry. It also had a continuing relationship with another consulting firm for building a knowledge base designed to capture the skills and competencies related to marketing its services to external customers. To oversee these partnerships, SUBSID had created a new executive position responsible for "Strategic Relation Planning" on the same level as the CFO and CIO, reporting directly to the CEO.

Despite these changes, the underlying principle remained the same: Anything SUBSID did would be under the free-market umbrella. If it could not compete with the other service providers on a level playing field, or better opportunities surfaced elsewhere, the deal would not be completed.

Conclusions. The strategic IS management profile during the initial evolutionary period had a high level of overall alignment although IS was considered nonstrategic. While ENERGY enjoyed good short-term IS performance, its business performance was deteriorating, apparently due to ENERGY's failure to react to the changing environment (reduced prices, increased competition).

A new CEO and a consultant's report provided further impetus for the revolution in which all four dimensions were changed, but alignment was maintained at a high level. At that time, a subsidiary focusing primarily on IS, SUBSID, was created. The initial strategic IS management profile of SUBSID had medium overall alignment. SUBSID's Prospector business strategy was not well aligned with the other dimensions, and it therefore was no surprise that over the next several months, SUBSID encountered problems in pursuing this strategy. Recognizing its limitations in seeking external growth, SUBSID underwent postrevolutionary changes. Its business strategy changed to Analyzer, which was better suited to the other three dimensions. Consequently, the overall alignment became high. Short-term business performance seemed to have improved as a result of this revolution by redesign.

Discussion

This paper has used a punctuated equilibrium model to examine the dynamics of alignment. Three case studies were used to better understand the way in which alignment evolves through modifications to an existing alignment pattern, punctuated by periodic transitions to an altogether different pattern of alignment. As discussed below, our results integrate prior literature and provide some new insights for organization science in general and for strategic IS management in particular.

Evolutionary Periods and Resolution Without Redesign. Each case had long periods of no change in the strategic IS management profile. Prior literature (e.g., Miles and Snow 1996) suggests that these evolutionary periods are characterized by a high level of alignment. We did find the evolutionary period to have a high level of alignment at ENERGY, but low overall alignment at LEASE. The overall alignment was medium at DIVFIN, although all the misalignments concerned IS strategy. Thus, the paper conforms to the punctuated equilibrium model, but differs in suggesting that the long evolutionary periods may sometimes have *low* alignment. The evolutionary periods at both DIVFIN and LEASE had misalignments which were apparently resolved without redesign, as both companies' top executives believed that IS was not strategic and so it did not need to be aligned with business.

Reluctance Toward Resolution by Redesign. Our cases reveal a reluctance in organizations to make revolutionary changes through which all or most of the dimensions of the strategic IS management profile are modified. At ENERGY, the consultant and managers initially commissioned to suggest strategic changes proposed a structure that was simply an improved version of the previous structure. Following this tentative change, ENERGY did undergo a complete revolution, but only due to the strong stance taken by the new CEO. Similarly, at LEASE, the pressure from the lender banks caused a revolution. However, it followed some initial hiccups, and a change in the CEO. The second revolution at LEASE encountered less hesitation than the first, but it was essentially a step back toward the strategic profile that had existed prior to the first revolution. The reluctance to make revolutionary changes was also evident at DIVFIN. A consulting firm's report initiated thinking about alternative ways of improving performance, but DIVFIN took time to identify ways of doing so. Moreover, it first looked for a vendor that was similar to itself, and quite reluctantly entered into a partnership with a culturally different vendor.

Thus, the paper suggests that occasional revolutionary changes in the deep structure (e.g., the strategic IS profile) may significantly help organizations in the long run, but such revolutions too may be inhibited by cultural or structural inertia (Tushman and O'Reilly 1996). Consequently, organizations sometimes change some dimensions of the deep structure, but not the remaining dimensions.

Revolutionary Changes and Resolution by Redesign. All three cases suggest that evolutions are punctuated by revolutionary changes in the strategic IS profile. Each company made revolutionary changes to transform the alignment pattern that had continued for a long time. ENERGY and LEASE underwent complete revolutions,

wherein all four dimensions were changed, whereas DIVFIN underwent an incomplete revolution as three dimensions were changed. This finding is consistent with the basic punctuated equilibrium model. Through evolutionary changes, managers incrementally alter strategies and structures to constrain the level of misalignment. However, "sooner or later, discontinuities upset the congruence that has been a part of the organization's success" (Tushman and O'Reilly 1996, p. 12).

Consistent with the reluctance to make revolutionary changes, we found all the revolutions to require some combination of five strong triggers—environmental shifts, sustained low performance, influential outsiders, new leadership, and perception transformation. At ENERGY, the strategic IS management profile during the initial evolutionary period had a high level of alignment. This profile had served ENERGY well for some time, but a new profile was needed when competition increased and prices declined. At LEASE, the initial strategic IS management profile was continued despite the low alignment, due to the belief that IS was not important. However, when the environment shifted with the new tax laws and changing economics of the IS industry, LEASE had to modify its strategic IS profile. All three cases indicated that alignment profiles may also be radically altered when the business or functional (IS in this case) performance deteriorates. For example, when faced with bankruptcy and the stringent controls enforced by the banks, LEASE quickly made large-scale changes in Revolution 1. As suggested by Gersick (1991, p. 27), the presence of influential outsiders also seemed to motivate revolutions. In all three cases, the revolutions were triggered by the actions of external agencies—the establishment and use of direct controls by the lending banks at LEASE, the consulting firm's report and the entry of international firms into the Australian market at DIVFIN, and the consulting firm's report at ENERGY. Moreover, the potency of these influential outsiders is amplified by changes in leadership (including a new CEO), which played a critical role in the revolutions at LEASE and ENERGY.

The above four factors—environmental shifts, sustained low performance, influential outsiders, and new leadership—have previously been discussed as possible triggers of revolutions (Haveman 1992). However, we found another trigger, perceptual transformation, which does not seem to have been discussed earlier. We found revolutions to be triggered by significant changes in the perceptions concerning IS (at LEASE in both revolutions as well as at DIVFIN) or the organization's skills in a certain area (e.g., the lack of deal-making skills at SUBSID). It is possible that we discovered this trigger because we examined alignment across an overall business domain and a specific area (i.e., IS).

Possible Ineffectiveness of Resolution by Redesign. It has been argued that if a low level of alignment, or conflict in the alignment profile, is responsible for the poor performance, organizations would seek to resolve this conflict by redesign (Gresov 1989). As discussed above, we also found that resolution by redesign is used to resolve such conflict. However, we found that the resolution by redesign may or may not be effective. At DIVFIN, the revolution did not increase overall alignment; it increased some types of alignment but reduced others. At ENERGY, the alignment within the strategic IS profile was high both before and after the revolution, although the revolution did change all four dimensions of the profile. Finally, the first revolution at LEASE increased alignment considerably, but the second revolution undid the changes and led to low alignment. Thus, the resolution by redesign in revolutions may not lead to an increase in overall alignment, and sometimes may even reduce it.

Postrevolutionary Changes. Because revolutions sometimes reduce alignment, they may be followed by further adjustments in alignment patterns. At DIVFIN, structural alignment decreased after the revolution, as the business structure had remained decentralized but IS management became centralized. This caused problems in implementing the outsourcing relationship. Consequently, the management of the relationship was re-decentralized (this increased structural alignment). At SUBSID, the overall alignment in postrevolution strategic IS management profile was medium. This was addressed by shifting business strategy to Analyzer and focusing on corporate siblings, while also seeking external revenues. No change to the strategic IS management profile was made at LEASE during the evolutionary period following the first revolution. However, shortly after the first revolution had produced the desired improvements, the second revolution caused the strategic IS profile to revert almost entirely (all three aspects except IS structure) to the profile before the first revolution.

Thus, the paper suggests that revolutions may be followed by postrevolution adjustments to the strategic IS management profiles, either to reinforce them or to take a step back toward the prerevolution situation. A revolution may take the organization too far in another direction, and the new alignment pattern may be inappropriate for its competencies, causing the organization to seek new competencies and further modify the alignment pattern. In some other cases, the revolution may not go far enough, and the changed strategic IS profile may be low in one or more kinds of alignment. This may cause the organization to further fine-tune the alignment pattern, possibly by reverting somewhat toward the prerevolution situation. Such postrevolution adjustments are consistent

with Sastry's (1997) suggestion that trial periods, similar to our postrevolution adjustments, follow revolutions.

The above observations should be viewed in the light of the study's limitations, which restrict its generalizability. First, the paper is limited due to the use of a small number of cases. The findings are based on only three companies, although they are of different sizes and from different industries. Second, the cases were studied retrospectively. The interviews were conducted during one to three visits at fairly close points in time, but our focus was on changes that occurred over long time periods. Third, although we collected the data using key informants at each organization, a wider set of informants may have provided additional insights. For example, only one non-IS executive was interviewed at DIVFIN. We also could not interview some important executives who were no longer at these companies.

The paper has several implications for future research in the broad area of organization science. First, the approach of viewing alignment in conjunction with punctuated equilibrium models should be valuable in future research. Research on dynamics of alignment in other areas may similarly consider an alignment profile (involving strategy and structure of the overall business and a functional area) as the deep structure that undergoes evolutionary and revolutionary changes (Gersick 1991).

Second, our use of Gresov's (1989) work on conflict among multiple contingencies should also be of interest to researchers in other aspects of organizations. This paper has shown the value of Gresov's resolution by redesign and resolution without redesign approaches for viewing alignment in the long run. These approaches may also explain two deviations we found from prior research (e.g., Miles and Snow 1996); unlike prior research we found that: (a) the evolutionary period may or may not be characterized by a high level of alignment; and (b) the revolutionary change does not always increase alignment. The use of resolution without redesign during evolutions could explain why some companies continue for a long time with what appears, at least to outsiders, as a low level of alignment. The use of resolution by redesign might explain why revolutionary changes do not increase alignment; it might reduce alignment among some dimensions and thereby offset increase in alignment among other dimensions. Further research on punctuated equilibrium models in other areas is needed to examine how resolution without redesign can help sustain low alignment in the absence of substantial performance degradation. Further research is also needed to examine the conditions that influence whether alignment will increase or decrease as a result of revolutions.

Third, we found strategic and structural changes during the revolution to be reinforced or offset by postrevolutionary changes. Such postrevolutionary changes have not been examined in prior field research. Further research is needed to validate or refine our classification of periods of changes in alignment profiles into evolutions, incomplete or complete revolutions, and postrevolutionary changes. Additional case studies examining changes in alignment profiles should help in doing so.

Finally, we found that revolutions may be triggered by a number of factors, one of which—perception transformation—has received little attention earlier. Studies of punctuated equilibrium models in other areas (e.g., research and development) may examine if substantial changes in perceptions about the importance of that area may similarly trigger revolutionary changes. Additional cases should also examine other causes that may trigger revolutionary changes.

The paper also makes some potentially important contributions to the literature on strategic IS management by taking a dynamic, holistic, and theory-based view of alignment. Our examination of the changes over time in three cases is an initial step in making the transition from the earlier static view of alignment toward understanding the dynamics of alignment. By examining the cases individually and in comparison to each other in the light of a punctuated equilibrium model, the paper provides insights into the ways in which alignment may possibly increase or decrease over time. Future research in this area should empirically test these findings, using additional cases as well as multistage surveys.

This paper also contributes to the strategic IS literature by providing a more holistic view of strategic IS management. The strategic IS management profile included business and IS strategy and structure, unlike prior studies which have focused on only two of the four dimensions, such as business and IS strategy (e.g., Chan et al. 1997) or business and IS structure (e.g., Fiedler et al. 1996).

This study also differs from the prior work on IS alignment in its use of a deductive, theory-based view of alignment. Future studies of alignment in strategic IS management and other areas may benefit from a similar use of prior theory to identify the ideal alignment patterns. This approach, which has rarely been used in IS research (Jarvenpaa and Ives 1993, Brown and Magill 1998), is an attractive alternative to the more popular approach of empirically generating the ideal alignment patterns (e.g., Sabherwal and Kirs 1994) because it allows replication and fosters cumulative research.

In conclusion, the paper has attempted to advance our understanding of the dynamics of alignment. The paper

suggests that claims about performance effects of alignment should be couched in explicitly longitudinal terms because the same alignment pattern may not be effective over extended periods. Based on the application of the punctuated equilibrium model to the three cases, the paper suggests that the changes in alignment are, for the most part, small and evolutionary. These changes may prevent catastrophes by controlling misalignments, but they inhibit moving to an altogether different pattern of alignment. Therefore, managers should periodically scrutinize their organizations' IS alignment patterns, lest these patterns mask symptoms of future failure. Revolutionary changes in the strategic IS management profiles may be necessary to move the organization to a path that offers a greater performance potential, rather than continuing on the previous path by simply fine-tuning strategies and structures. Moreover, managers making revolutionary changes in their "deep structures" should be prepared to fine-tune them even after (and especially, soon after) the revolution.

Acknowledgments

The authors are grateful to the editor-in-chief, the senior editor, and the two anonymous reviewers at *Organization Science* for their numerous suggestions on earlier drafts of this paper. We also greatly appreciate the valuable suggestions provided by the seminar participants at Florida State University.

Endnotes

[1]Miles and Snow (1978) also described a fourth type of organizations (Reactor), but considered it to be one that either lacks a viable strategy or is in transition from one of the three ideal strategies to another. Miles and Snow (1996) excluded Reactors in more recent descriptions of the typology. We therefore excluded Reactors, as was done in most empirical studies using this typology (e.g., Delery and Doty 1996).

[2]Miles et al. (1978) identify three broad types of problems (entrepreneurial, engineering, administrative) faced by organizations, and solving the entrepreneurial problem in their model is equivalent to corporate-level decisions, while solving engineering and administrative problems corresponds to business-level decisions (Beard and Dess 1981).

[3]Nonstrategic IS was considered to have low alignment with all business strategies and structures.

[4]This situation did not seem to surface in the cases either.

[5]The names of all companies and individuals are disguised to maintain confidentiality.

[6]All figures in all three cases are in United States dollars.

[7]Similar to most leasing firms, LEASE made its profit by (a) charging an interest rate on its leases above its cost of money; (b) selling equipment returned to it at the end of a lease for more than the customer was credited. If the market price of used equipment tumbled, as was the case with mainframes, it lost money.

[8]It included all senior managers who had anything to do with the sales deals.

[9]"Black packets" were black vinyl folders containing everything about a lease, which were examined in great detail by a group of representatives from each department.

[10]This happened somewhat differently across the business divisions, with the property services division bringing its own IS director on board before the financial services division.

[11]For example, instead of using existing external knowledge bases and vendors, oil rigs and drilling platforms were designed and built in-house, from scratch.

[12]Zmud et al. (1986) discuss a similar "federal governance" model of IS management.

[13]It now placed greater emphasis on employee development, not only to improve performance but also to help the employees become more marketable.

[14]The other people worked in non-IS lines of business. SUBSID worked primarily in IS, but also offered other services, such as financial services, accounting services, and distribution channel management.

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Accepted by Gerardine DeSanctis; received November 1997.

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