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# Organizational options for resolving the tension between IT departments and business units in the delivery of IT services

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**Abstract** *The organization of companies' information technology (IT) functions has been studied and described in three ways: on a centralization-decentralization continuum, on the basis of technological architecture, and, for multinational companies, as reflective of their strategic focus. This research proposes a classification of organizational structures based on the tension between business units and IT departments in the delivery of IT services. Using a cluster analysis on a sample of 40 companies having corporate offices in the USA or The Netherlands, it identifies four basic structures or patterns that describe the similarities and differences in the way IT services are handled. The paper then describes the implications of these structures for companies that are considering the redesign or restructure of their information technology function.*

## Introduction

Restructuring of the information technology (IT) function occurs frequently in today's companies. The speed of change in the technology itself, the recent explosion in the use of electronic commerce, and the growing globalization of business drive companies to reassess the way they deliver information technology services. Companies may also reassess the way they deliver IT when they appoint new leadership to the IT function, as each leader typically brings his or her preferences for service delivery to the organization. Although companies often adjust their structure to resolve problems or issues in minor ways, often a more serious, long-term realignment is required. Then management needs to know what options are feasible, and which are most appropriate and desirable for their type of company given the conditions or environment it faces. This research is part of an ongoing study that addresses these issues. In this paper, we identify the most common types of structures, identify the features they share, and describe the environments in which they prosper. Understanding these types allows executives to better know the available structural options and their likely impact.



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### Existing research on IT structure and control

The organizational structure of the IT function has been an active area of research for at least the last two decades (Brown and Magill, 1994; Dearden, 1987; Ein-Dor and Segev, 1982; King, 1983; King and Sethi, 1999; Niederman *et al.*, 1991; Olson and Chervany, 1980; Tavakolian, 1989; Tractinsky and Jarvenpaa, 1995). The research on IT structure and business units has focused primarily on three issues:

- (1) control versus coordination, often recast as centralization versus decentralization;
- (2) the nature of the IT architecture, specifically the IT hardware and software infrastructure; and
- (3) IT coordination and control in multinational companies.

#### *The centralization-decentralization continuum*

Centralization refers to allocating IT resources and control to a single group, department, or business unit that then provides IT services to the entire firm. Decentralization gives individual business units the responsibility for control over local IT resources with little or no consideration for the company as a whole. The most basic analyses contrast the control, efficiency, and economy of centralization with the flexibility, empowerment, service-orientation, and responsiveness to individual needs of decentralization (Alter, 1996; Dearden, 1987; Kim, 1988; Laberis, 1998; Liebmann, 1999; Meyer, 1991; Von Simson, 1990).

Contingency theories posit a fit between the degree of IT centralization and a company's strategy and structure (Egelhoff, 1991; Leifer, 1988; Olson and Chervany, 1980; Slater, 1998). An important component of this fit is the alignment between IT centralization and the need for or extent of information sharing in the organization (Lee and Leifer, 1992; Simon, 1996). A decentralized structure facilitates the high level of information sharing required in some environments, whereas a centralized structure limits the sharing of information.

Hybrid models that allow IT services and their management to be simultaneously centralized and decentralized have attracted a great deal of attention (Boynton *et al.*, 1992; Cale *et al.*, 1993; Dearden, 1987; Saia, 1999; Sambamurthy and Zmud, 1999; Von Simson, 1990). A system that centralizes architecture management and systems support and decentralizes systems development and end-user support illustrates such a hybrid model. The shared internal services model also solves the centralization-decentralization conundrum. This model captures the economies of scale in centralization while keeping the support functions focused on the business units (Krempel, 1999; McWilliams, 1996).

#### *The architectural perspective*

Architectural research addresses how the type and location of IT resources, such as computers, communication equipment, data, and people, affect service delivery (Allen and Boynton, 1991; Boynton *et al.*, 1992; Sabherwal and Kirs,

1994; Targowski, 1990; Wreden, 1998). The trade literature has emphasized this research in times of technological change, such as during the early periods of client/server computing, Web-based systems, and electronic commerce.

Architectural research focuses on criteria of efficiency and flexibility, often arguing for an infrastructure that disperses IT and its management widely throughout the firm, or one that centralizes core IT activities and expands the role of senior IT executives. These options suggest extreme ways of IT interacting with the business units – either IT has sole responsibility for the infrastructure, or business units have such responsibility. Broadbent and Weill (1997) studied how successful firms make infrastructure decisions. They concluded that some companies manage by making deals between central IT and various business units, but that others rely on maxims, concise statements of a firm's strategic focus, to guide their infrastructure investments.

#### *Multinational perspectives*

The increasing globalization of business and the expansion of electronic commerce have prompted extensive research on the unique issues faced by multinational companies in structuring IT organizations. Both external and internal factors affect the design of the IT architecture and potentially influence the structure of the IT function. For example, MNC firm structure, strategic predisposition of the firm, and the organizational culture and personnel practices have been hypothesized to affect the information architecture (Simon, 1996).

The early research on IT structure in multinational companies mainly addressed decisions about whether to locate IT at corporate headquarters or within the geographical units (Alavi and Young, 1992; Burn and Cheung, 1996; Egelhoff, 1988; Gibson, 1994; Karimi and Konsynski, 1991; Roche, 1992; Sankar *et al.*, 1993). Early restructuring of multinational firms often treated business units as synonymous with geographical location. A study of the way responsibility for IT activities in operations, systems development, and planning/control was shared between parent companies and their US versus non-US subsidiaries began to focus on the business units of an organization as the key structural components (Cummings and Guynes, 1994). Still, this research did not explicitly look at the nature of the interaction between the IT function and the business unit.

Other research (Jarvenpaa and Ives, 1993) presents an alternative to the focus on centralization-decentralization and IT architecture for multinationals. The authors hypothesize that an organization's IT function is structured to support its strategy. Using the IT dimensions of locus of decision making, number of common systems, mode of operations, IT reporting relationship, and developmental approach, they identified four structural prototypes that were highly associated with the overall corporate strategy. But this research stopped at the strategy-structure interface and did not look further to the IT function-business unit interface.

Recent restructuring decisions in multinational corporations have refocused attention on the centrality of the business unit (Mazur, 1994; Sweeney, 1995; Westoby, 1996). Research about the structuring of the IT function has also acknowledged the importance of the business unit (Allen and Boynton, 1991; Cale *et al.*, 1993; Gordon and Gordon, 1999). Still, the bulk of the research has focused on the significance of the centralization-decentralization continuum and IT architecture for structuring.

### *Deficiencies in existing research*

Our research views the business unit as key, and so takes a first step at remedying a deficiency in the structure research. In particular, we focus on the interaction between the IT function and business units in organizations. We address the following questions:

- What types of governance structures describe the interaction of IT and business units?
- What features does each type of structure have?

The answers identify common patterns of IT governance that are instructive to practitioners seeking to reorganize the way their technology services are delivered. Knowledge of these patterns is also critical for researchers seeking to establish an understanding of how such structures arise and what outcomes can be expected from each. For example, a recent study seeking to identify the impact of multiple contingencies on IT governance assumed nine feasible governance structures based on three loci of control and three spheres of IT activity (Sambamurthy and Zmud, 1999). Focusing on a smaller set of common structures that are robust over a wider range of IT activities would extend such a study.

### **The study methodology**

This study used a survey methodology to assess the nature of IT-business unit interaction along four dimensions. The questionnaire (see the Appendix) first asked respondents to provide some basic information about themselves and their organization. Then we asked the respondents to describe the allocation of responsibility in their organization for establishing IT priorities, setting IT standards, developing information systems, and conducting IT operations. We constructed these questions based on factors that we found to be relevant in an earlier pilot study. Most of these questions sought answers on a five-point Likert scale, although some asked the respondent to select from a checklist. Finally, we asked questions about the stability of their structure for delivering IT services, how well it worked, and its strengths and weaknesses.

### *The study participants*

We administered the survey by mail to two groups of respondents. Chief information officers of 80 companies affiliated with the Center for Information Management Systems (CIMS) at Babson College received questionnaires and

follow-up postcards if they did not return their surveys. We received 23 completed questionnaires, and three questionnaires were returned as undeliverable. We also mailed questionnaires to 180 graduates of the masters degree program in Information Systems at the University of Amsterdam, but did not send follow-up reminders. We received only 17 responses from this sample. We expected a low rate of response because of the lack of follow-up and because many of these graduates had not had the time to progress to management positions from which they would have the knowledge to answer the questions. Table I offers a profile of the respondents. With the exception of questions related to satisfaction with the existing organizational structure, there is no reason to believe that response bias has affected our results.

The profiles of the US and Dutch respondents display several similarities. The largest percentage of both US and Dutch respondents said they worked for a domestic company. An almost equally large percentage of US respondents said they worked for truly global companies, whereas the next largest group of Dutch respondents said they worked for international companies with a limited global scope. Revenue information was available for most US companies; their revenues most often exceeded \$1 billion. Revenue information was less available for the Dutch companies; here too the largest group had revenues greater than \$1 billion.

#### *Data analysis*

Our goal was to determine which companies are most similar and what common characteristics they share. Because cluster analysis is the most

	US companies (N = 23)	Dutch companies (N = 17)
Response rate (%)	29	9
<i>Company type</i>		
Domestic (%)	35	33
Sell internationally, manufacture domestically	9	0
Manufacture internationally, sell almost solely domestically	0	0
Sell and manufacture internationally, but primarily domestic company	9	11
International company	9	28
Global company	30	11
Other	9	11
<i>Revenues of company (\$)</i>		
Greater than 1 billion	39	35
500 million to 1 billion	30	0
Less than 500 million	22	18
Data not available	9	35

**Table I.**  
Profile of the  
respondents



appropriate statistical technique for this purpose, we applied it to the data using SPSS statistical software. We clustered cases based on the values of the nine Likert-scale variables that describe the delivery of IT services and the setting of standards (questions 11 through 20). This approach is considered a data inductive one because the number and characteristics of the clusters are not known prior to the analysis; hence the technique is exploratory (Afifi and Clark, 1990). We used squared Euclidean distance to measure the similarity of observations and used the Ward linkage procedure, which minimizes within group variance, to sequence the clustering. One observation, omitted from the analysis due to its missing data on two variables, was later classified using the other variables.

We then ran a discriminant analysis on the data using the cluster group as the dependent variable and the Likert-scale variables as the independent variables. The discriminant analysis validated the cluster analysis by proving the existence of functions that could discriminate among the groups. These discriminant functions correctly predicted the cluster-analysis group of all but one of the observations, which we reclassified for our subsequent analyses.

We then determined the mean response for the Likert-type scales and the percentage of response for the other scales for each of the four clusters. Finally, we content analyzed and scored the open-ended responses regarding how well the current structure works. We converted the open-ended responses into a three-point scale, with: (1) representing satisfactory or excellent with no needed changes specified, (2) representing satisfactory but significant changes needed, and (3) representing unsatisfactory with significant changes needed.

## Results and discussion

Because our research was exploratory, we examined different sets of clusters consisting of two, three, four, and five groups. Combining these results with those of the discriminant analyses, we ended with a four-cluster solution. Table II addresses differences among the clusters in the key area of focus for this study, as motivated by the literature review and by our pilot study, namely the tension between the business units and the central IT group. Each line of this table presents a single technical function, such as IT operations, about which respondents described the extent to which that function was performed by the IT group or by the company's business units. Table III presents differences among the clusters in other characteristics of IT standard setting and organization structure that we measured. Table IV shows how companies in different clusters funded the IT function. Finally, Table V presents corporate-level characteristics of the companies in each cluster.

This section is organized by cluster rather than table. We describe the key characteristics of each cluster and highlight how each differentiates itself from the others. In the next section, we revert to the view by table, because it is easier in that context to describe the implications of our findings.

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**Table II.**  
Dominance of business unit vs IT for technical functions, by cluster (1 = determined by IT; 5 = determined by business unit)

	Cluster 1 (N = 12)	Cluster 2 (N = 15)	Cluster 3 (N = 8)	Cluster 4 (N = 5)	F (df = 3)	Sig.
Company-wide resource allocation <sup>a</sup>	2.1	1.8	3.9	4.4	26.0	0.000
Local resource allocation <sup>a</sup>	1.8	4.1	3.9	5.0	24.8	0.000
Company-wide project scheduling <sup>a</sup>	2.3	2.0	2.6	4.6	9.89	0.000
Local project scheduling <sup>a</sup>	2.3	4.1	2.8	5.0	18.8	0.000
Enforcement of standards <sup>a</sup>	1.0	2.4	2.9	2.2	7.92	0.000
Standard setting <sup>a</sup>	1.3	1.6	1.9	2.0	1.56	0.215
Running of technical operations <sup>a</sup>	1.3 <sup>b</sup>	2.7	1.5	2.4	4.86	0.006
Systems development <sup>c</sup>	2.6	3.8	3.6	3.3	3.66	0.022

**Notes:** <sup>a</sup> Likert scale: 1 = "determined by IT," through 5 = "determined by business unit"

<sup>b</sup> N = 11

<sup>c</sup> Question No. 10. Although there were five choices, roughly in order of increasing business unit involvement, each choice corresponded to a specific description, rather than a point on a Likert scale

**Table III.**  
Other characteristics of IT function, by cluster

	Cluster 1 (N = 12)	Cluster 2 (N = 15)	Cluster 3 (N = 8)	Cluster 4 (N = 5)	F (df = 3)	Sig.
Business needs rather than tech expertise drive IT standards <sup>a</sup>	3.1	2.6	3.3	3.4	1.15	0.342
Standard setting is decentralized <sup>b</sup>	1.4 <sup>c</sup>	1.7	1.4	2.2	2.222	0.103
Satisfaction <sup>d</sup>	N = 11	N = 12	N = 8	N = 1	0.196	0.898
	1.6	1.8	1.9	2.0		
<i>Change recent or soon<sup>e</sup></i>						
Standards	1.5	1.9	1.6	2.2	1.44	0.247
Struct. of IT group	2.0	2.3	2.0	2.0	0.647	0.590

**Notes:** <sup>a</sup> Likert scale: 1 = "tech expertise," through 5 = "business needs"

<sup>b</sup> Likert scale: 1 = "centralized," through 5 = "decentralized"

<sup>c</sup> N = 11

<sup>d</sup> 1 = very satisfactory; 2 = satisfactory, but significant changes needed; 3 = unsatisfactory

<sup>e</sup> 1 = "more than 2 years ago," 2 = "within the last year or two," and 3 = "currently changing or soon to change"

### *Cluster 1 – IT dominated companies*

We termed Cluster 1 "IT dominated," because the central IT groups of companies in this cluster dominate all surveyed information technology activities. Table II demonstrates the extent of this dominance. On the seven Likert-scale questions (the first seven dimensions listed), where respondents rated activities as determined by IT (1) or business units (5), the average score

## Organizational options

	Cluster 1 (N = 12)	Cluster 2 (N = 15)	Cluster 3 (N = 8)	Cluster 4 (N = 5)	F (df = 3)	Sig.
Average IT budget as % of revenues <sup>a</sup>	N = 7 6.3	N = 7 4.7	N = 5 1.9	N = 3 2.1	0.460	0.714
Average % of IT outsourced	12.6	13.7	32.3	14.3	4.039	0.015
Funding (% funded by corporate) <sup>a,b</sup>	N = 9 89	N = 10 70	N = 6 50	N = 5 0	NA	0.008

**Notes:** <sup>a</sup> N is reported because of the poor response to this question

<sup>b</sup> Question No. 11, Kruskal Tau test with Funding as the dependent variable. For Clusters 1 through 3, companies not funded by a corporate budget were funding by chargebacks to the business units. For Cluster 4, four companies charged the business units and one operated IT as a profit center

**Table IV.**  
Funding of the IT function, by cluster

	Cluster 1 (N = 12)	Cluster 2 (N = 15)	Cluster 3 (N = 8)	Cluster 4 (N = 5)	Test	Sig.
<i>Size/complexity</i>						
Business units	3 or 4	5 or more	3 or 4	5 or more	F (df = 3)	0.037 <sup>a</sup>
Median gross rev. (\$M)	N = 8 550	N = 12 1650	N = 7 750	N = 3 3733	F (df = 3) Median	0.207 <sup>b</sup> 0.140
<i>Int'l environment</i>						
Int'l Presence <sup>c</sup>	1.73	3.69	4.29	5.20	F (df = 3)	0.005
HQ in US: no. Percentage	8 67	8 53	5 63	2 40	Lambda Kruskal Tau	0.654 <sup>d</sup> 0.787 <sup>e</sup>
HQ Control <sup>f</sup>	2.09	1.87	1.88	1.20	F (df = 3)	0.211

**Notes:** <sup>a</sup> Raw numbers are unavailable. Test is on Question No. 5 (1=1; 2=2; 3=3 or 4; 4=5 or more)

<sup>b</sup> Test on log of gross revenue. Many companies did not report gross revenue

<sup>c</sup> Test is on Question No. 3, scored 1 = "not at all," to 6 = "view ourselves as a global company"

<sup>d</sup> Symmetric Lambda

<sup>e</sup> Cluster as dependent variable

<sup>f</sup> HQ control over decision making, scored 1 = "business units have a great deal of autonomy," 2 = "decision making tends to occur collaboratively among corporate HQ and business units," and 3 = "corporate HQ exerts control over most major decisions"

**Table V.**  
Company characteristics by cluster

for companies in Cluster 1 never exceeds 2.3. On four of these questions, the score averages below 2.0, indicating that respondents felt that IT was strongly dominant. On all but two of the questions, the score for companies in this cluster is lower (toward IT vs the business units) than that of any other cluster. On the two activities where Cluster 1 scores above Cluster 2, the difference is not statistically significant ( $p > 0.35$ ).



Systems development, measured on a non-Likert but ordinal scale, also shows IT dominance, with an "average" score well below that of any other cluster. Two of the 12 IT dominated companies report that systems development is led and performed by corporate IT alone. None of the 28 companies in the other three clusters report such exclusion of users and business leaders. At three IT dominated companies, systems development is led by corporate IT while heavily involving users. Only four other companies in the sample observe such a practice. Still, more than one-half of the IT dominated companies claim that their systems development is a partnership between corporate IT and either users or business unit leaders. Apparently, even among these companies, where the IT department dominates the delivery of all other technical services, it does not dominate software development. Nevertheless, in contrast to the other clusters, no company in this cluster had business units that led and performed systems development.

The IT department controlled standards at IT dominated companies more than at any other group. IT was more important in setting standards and enforcing standards, and standards were more highly centralized. At more than one-half of the companies, IT selected and enforced standards and business units lived within those standards. It was surprising to find, then, that respondents in the IT dominated companies felt, overall, that business needs are more important than technological expertise in driving standards (Table III). Although the differences among the groups on the question of driving standards was not significant, it is curious that a different cluster, Cluster 2, found technological expertise more important than business needs while the IT dominated companies found business needs to be more important than technological expertise. Perhaps, at IT dominated companies, technological expertise was at such a high level that its contribution to standard setting was implicit rather than explicit. Although the IT department controlled the standards, it felt driven to understand and respond to the business needs of the company.

The funding of the IT function in IT dominated companies differs from that of other clusters in expected ways. The IT dominated cluster had the highest percentage of companies funded by corporate as a G&A expense and the lowest percentage of IT outsourced. Eight of the nine IT dominated companies that responded properly to the question about funding indicated that they funded the IT function as G&A expenses; only one company funded IT through chargebacks to the business units. When business units have no financial stake in the funding of IT, they generally have little voice in its operation, standards, or priorities. Also, these companies have little incentive to outsource, and tend to retain functions in-house when they have the expertise.

At the corporate level, IT dominated companies tend to be small, domestic companies with functional divisions. They report the lowest median gross revenue of all the groups: only 25 percent of the IT dominated companies that reported their annual revenue on the survey had revenues in excess of \$1 billion, as compared to 59 percent of the remaining companies. Only 42 percent

had five or more business units, compared to 76 percent for the rest of the sample. Only one-quarter had any international presence (sales or manufacturing), and none views itself as a global company. Six of the nine multidivisional companies have a functional structure. Only five other companies in the entire sample are structured this way. This structure might be related to their relatively small size, as larger companies often evolve into more complex structures.

IT dominated companies are generally satisfied with their IT structure. Of the 11 companies responding to this question, two expressed dissatisfaction and three expressed satisfaction while noting a need for some significant changes. This cluster exhibited the best satisfaction score, but differences among clusters on this variable were not statistically significant.

#### *Cluster 4 – business dominated companies*

At the other end of the spectrum are the companies in Cluster 4. We label this cluster “Business dominated” because of the extensive involvement of business units in all aspects of IT delivery. Although the number of companies in this cluster is small, its existence, as a counterpoint to the IT dominated cluster, was expected.

The contrast between Clusters 1 and 4 on most of the variables in this study is significant despite the small size of Cluster 4. The clusters differ significantly in company-wide and local resource allocation and company-wide and local project scheduling ( $p < 0.01$ ). If one assumes equal variances, the clusters differ in standards enforcement and running of technical operations ( $p < 0.05$ ) and in standard setting at ( $p < 0.10$ ). The only IT activity where they are not significantly different is in systems development.

Still, the contrast between the two groups is not as complete as we might have expected. While the resource and project scheduling variables average greater than four, indicating dominance of the business units in these activities, systems development is only slightly above three, and standard setting, standards enforcement, and operations average between two and three. On the latter activities, the IT departments exert more influence than do the business units, although still not as much as in IT dominated companies. An ideal contrast to the IT dominated prototype would be a company in which all IT activities were dominated by the business units. None of our sample demonstrated this behavior.

Systems development at business dominated companies is consistent with what one might expect. In no case was the development of information systems led and performed solely by corporate IT. Instead, some type of collaboration between IT and business units was most common, with one company describing information systems development as led and performed by the business unit leadership.

Not surprisingly, the funding of the IT function at business dominated companies differs markedly from that of IT dominated companies. None of the business dominated companies are funded out of a corporate G&A account,

compared to 89 percent of the IT dominated companies. All of the business dominated companies reimburse IT costs by charging them to the business units, either as a chargeback, at cost, or as a profit center, with a profit margin included. These structures are consistent with autonomous business units and the business unit control of IT services that distinguishes this cluster.

Although the company variables of Table V were not used to create the clusters, the IT and business dominated clusters differ dramatically on these variables. If equal variances are assumed, the clusters differ on number of business units and international presence ( $p < 0.01$ ), headquarters control ( $p < 0.05$ ), and gross revenue (log transform,  $p < 0.10$ ). The US/Dutch company distribution was not significantly different between the two clusters.

The difference in size and complexity between the IT and business dominated groups is striking. All of the business dominated companies have at least five business units. The three companies that reported revenue data have revenues in excess of \$1 billion. The sample includes both manufacturing and service companies. None of the companies reported a functional structure, and all reported significant international or global presence.

Regarding decision making for the company as a whole, four of the five companies reported that business units had a great deal of autonomy, while the fifth reported that decision making tends to occur collaboratively among corporate headquarters and business units. The autonomy of the business units at the corporate level is consistent with the way in which business units participate in the delivery of IT services.

Only one of five respondents indicated how well the current structure worked, and suggested that it was generally satisfactory with some reservations. Three of five companies had recently reorganized, and another of the companies was currently restructuring or planned to do it soon.

#### *Cluster 2 – distributed companies*

If Clusters 1 and 4 reside at two ends of the spectrum from IT dominated to business dominated, it seems logical that Clusters 2 and 3 would fill the space between them. But the situation is not as simple as it appears. The cluster analysis aggregated points in a complicated nine-dimensional space into four groups that are relatively easy to describe. But, the clusters themselves are far from uni-dimensional, as the term “spectrum” might imply. Some areas of this space are relatively sparse, such as those in which business units set standards. Although Clusters 2 and 3 share properties that distinguish them from the IT and business dominated clusters, they are not alike. In fact, when the cluster analysis is allowed to proceed, it aggregates Cluster 3 with the business dominated group rather than with Cluster 2.

We have called Cluster 2 “distributed” because, compared to Cluster 3 and in absolute terms, it is more like the IT dominated cluster when dealing with company-wide IT services and more like the business dominated cluster when dealing with other IT services. For example, in company-wide IT resource allocation and project scheduling, the distributed cluster leans even more

heavily on the IT department than the IT dominated cluster. Fully 40 percent of the companies in the distributed cluster, compared to 25 percent in the IT dominated cluster indicated that the IT department was strongly responsible (1 on the Likert scale) for company-wide resource allocation. About 47 percent of companies in the distributed cluster compared to 17 percent of the companies in the IT dominated cluster said that the IT department was strongly responsible for company-wide project scheduling. For standard setting, which can also be considered a company-wide activity, the distributed cluster was more like the IT dominated cluster than like the business dominated cluster.

For other activities, such as allocating local IT resources, scheduling local IT projects, running technical operations, developing systems, and enforcing standards, the distributed cluster is more like the business dominated cluster than the IT dominated cluster. For example, distributed companies have the highest involvement of business units in IT operations compared with all other groups, even those in the business dominated cluster. When asked whether corporate IT (indicated by a 1) or the business units (indicated by a 5) operate information technology services, more than one-half the companies answered between 3 and 5.

Systems development at distributed companies also tends to have the heavy involvement of the business units and users. IT had a leadership role in systems development in only one of 15 cases. In the other cases, the respondents described systems development as either "a partnership between corporate IT and users," "a partnership between corporate IT and business unit leadership," or "led and performed by the business unit leadership." In the one case where IT took a leadership role, users were heavily involved in the development.

Although IT tends to have the primary responsibility for standards oversight and enforcement, IT is less dominant than for any cluster other than the IT dominated one. For example, only 20 percent of the companies in the distributed cluster indicated that the IT department is strongly responsible for enforcing standards (1 on the Likert scale), compared to 40 percent of those in the business dominated cluster who responded in that way. Nevertheless, the technology seems to drive standards more strongly at the distributed companies than in any other cluster.

Like IT dominated companies, distributed companies funded IT primarily through a G&A charge to the corporate budget. However, 20 percent of the companies reported funding IT through chargebacks to the business units, and 33 percent reported some combination of G&A and chargeback funding.

Distributed companies tend to be large, as indicated by their revenue and structural complexity. Two-thirds of those reporting sales had sales of at least \$1 billion, and their median annual revenue is \$1.65 billion, about three times the median revenue of IT dominated companies. A total of 80 percent had at least five business units. This finding is consistent with the influence of the business units in this type of company. It is also consistent with the size of



these companies, being large enough to support IT operations within the business units without too much sacrifice in economies of scale.

This cluster had a large percentage (42 percent) that indicated the structure worked well; 42 percent had some reservations about the structure; 17 percent felt that it needed major changes. For this cluster, an equal percentage indicated that they had reorganized more than two years previously, within the last year or so, or were currently reorganizing or soon would restructure their IT group.

### *Cluster 3 – business resource controlled companies*

Cluster 3 is characterized by its companies' business units having primary responsibility for IT resource allocation and systems development, their IT departments having primary responsibility for standard setting and operations, and a shared IT/business unit responsibility for other areas of IT activity. We have called it "Business resource controlled" for two reasons. First, aside from systems development where all clusters show significant business unit involvement, the only activities where business units exerted more influence than IT (i.e. where the average score was greater than three) was in resource allocation, both company-wide and local. Second, this cluster had by far the highest percentage of IT outsourced. The perception is that of businesses moving their IT resources away from their IT departments. Consistent with this level of control, although not significant, is that the IT budget for companies in Cluster 3 is a lower percentage of company revenue than for any of the other clusters.

Business resource controlled companies tend to be medium-sized, with about half having annual revenues exceeding \$1 billion. Five of the eight companies reported having three or four business units, while only one reported having five or more. Only one of the eight companies in this group considers itself to be a domestic company. Most of the others consider themselves to be either a global company or an international company with a limited global scope.

Standard centralization is as prevalent in business resource controlled companies as in IT dominated companies. All but one company indicated that the IT department was responsible for setting standards. Nevertheless, business needs, as much as technology, tended to drive standards, and enforcement of standards was as frequently left to the business units as to IT.

Without exception, the respondents indicated that IT is more likely than the business units to run the technical operations. However, business resource controlled companies have outsourced an especially large percentage of their IT function. Six of the eight companies have outsourced at least 33 percent of their IT operating expenses. The average percentage outsourced is 32 percent, compared to under 15 percent for each of the other groups of companies. This degree of outsourcing could explain the relatively heavy reliance on the IT department for project scheduling, as IT departments generally supervise and oversee the operations of outsourced IT activities. It could also explain the extent to which IT standards are centralized.

This cluster had the smallest percentage (25 percent) that believed the structure worked well (with the exception of the fourth cluster in which there was only one scorable response). Of this group, 50 percent had recently reorganized, while only 25 percent were currently restructuring or planned to do so soon.

### Implications and conclusions

The four clusters identified in this research reflect differences in the ways that the tension between a company's central IT group and its business units is resolved for the control and delivery of various IT services. We can consider the cluster centroids as prototypical or representative of a class of companies that deal with these tensions and forces in consistent ways. We have labeled them and present them as useful models for further study.

If the clusters in this study differed only in the organization of their IT functions and their relationships to the business units, this research would be of limited value. However, we have also demonstrated that they differ on dimensions that were not associated with their statistical creation. For example, as shown in Table IV, the clusters differ in the way that IT services are funded. And, as shown in Table V, different clusters seem to be more common in different types of companies. We have neither shown nor attempted to show causality in these relationships. Although it seems likely that the delivery of IT services is more a function of company size, structure, and international complexity than the reverse, it is also reasonable to assume that in some ways a reciprocal relationship exists, if only because company growth might otherwise be constrained by its information systems and their delivery.

It is in this context that practitioners should take note of this research. Overall, no one form of structure and control for IT services seems optimal. There is no significant difference in the extent of satisfaction with the different approaches, and there is no statistical significance in the rate at which different types of companies change their structure. However, it is clear that the smaller, less complex companies tend to follow the IT dominated prototype, while the larger, multi-divisional, global companies tend to follow the business dominated prototype. It is also clear that funding IT as a corporate overhead account is related to the IT dominated prototype and that a charge-back or profit-center funding scheme is related to the business dominated prototype.

What does this mean for companies that are growing, and what are the roles of the distributed and business resource controlled prototype? The following assertions require more research, specifically a longitudinal study over a larger sample, to prove their validity. However, the implications of the current research are clear. It appears that the IT dominated prototype is appropriate only for relatively small companies – those with three or four divisions and under \$1 billion in sales. Although there are sure to be exceptions, most companies in order to grow will need to evolve, giving their business units

more control over IT resources and functions. One strategy is to move toward the business resource controlled prototype, which involves giving to the business units control over spending for IT and control over IT resource allocation. A large measure of outsourcing normally follows this prototype, perhaps as a means to wrest control from the central IT group, perhaps as a transition to support the business units as they gain technical expertise, or perhaps simply because the IT department cannot keep up with the intended growth. Another strategy to accommodate growth is to move toward the distributed prototype. Here the business units assume more control over local IT resources, local project scheduling, and systems development. It is natural to put control closer to the decision maker, and as businesses grow, a central IT department would normally begin to feel too distant from the decision makers that they are mandated to support. The distributed prototype seems to be a model that allows the IT department to gradually distribute such control while maintaining the efficiency of a central authority for company-wide decisions. We envision an easy path from either the distributed or the business resource controlled model to the business dominated model, although it is not clear that such an evolution is ever necessary. In particular, many of the companies following the distributed model were very large, complex, and global.

The topic of standards provided some of the most interesting results of this study. We had expected a pattern of standard setting that mirrored other differences in the four clusters, particularly along the centralization and decentralization dimension. Instead, we found that practices regarding IT standards are relatively uniform. For example, the driver of standards (business needs or technological expertise), who sets the standards (IT or business units), and the extent to which standard setting is centralized show no statistically significant difference among the groups. The only significant difference pertaining to standard setting was who enforced the standards once they were set.

Future research needs to focus on several areas to address limitations of this study. First, replication of the study with a larger and more diverse group of companies is necessary to validate the results. We believe that increasing the sample will allow a better analysis of the validity of the results for various types, sizes, and locations of companies. Separating multinationals from the rest of the companies might also be interesting. Second, a more comprehensive measurement of effectiveness is necessary. While we attempted to show the links between satisfaction and cluster type, more extensive analysis of this relationship might prove fruitful. Finally, a longitudinal study is required to show how and why companies change as they grow. This cross-sectional study has laid the basis for establishing the changes we would expect to see. Case studies that trace the management of change, and large-scale studies to show the types of change, will be instrumental in helping managers in growing companies to evolve the structure of their IT departments and to rationalize their relationships to the business units.

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**Appendix. Survey**

Please circle the correct answer or provide the required information.

*General questions about you and your company*

- (1) Name of your company:
- (2) Your position in the company:
- (3) To what extent is yours an international company?
  - (a) Not at all
  - (b) Sell internationally, manufacture domestically.
  - (c) Manufacture internationally, sell almost solely domestically.
  - (d) Sell and manufacture internationally, but view ourselves primarily as a domestic company.
  - (e) View ourselves as an international company, but with limited global scope.
  - (f) View ourselves as a global company.
  - (g) Other. Please describe.
- (4) What were your company's gross revenues for fiscal year 1997?
- (5) How many business units does your company have?
  - (a) 1.
  - (b) 2.
  - (c) 3 or 4.
  - (d) 5 or more.
- (6) How is your company structured?
  - (a) Functional divisions.
  - (b) Product line.
  - (c) Geographical.
  - (d) Matrix.
  - (e) Virtual.
  - (f) Other. Please describe.
- (7) Which choice best describes decision making for your company as a whole?
  - (a) Business units have a great deal of autonomy.
  - (b) Corporate headquarters exerts control over most major decisions.
  - (c) Decision making tends to occur collaboratively among corporate headquarters and business units.
  - (d) None of the above. Please describe.

*General questions about IT services in your company*

- (8) What is the budget of the corporate IT department?
- (9) What percent of your company's IT operating expenses is for outsourced services?
- (10) Which choice best describes information systems development?
  - (a) Led and performed by corporate IT.

- (b) Led by corporate IT, but involving users heavily.  
 (c) A partnership between corporate IT and users.  
 (d) A partnership between corporate IT and business unit leadership.  
 (e) Led and performed by the business unit leadership.  
 (f) None of the above. Please describe.
- (11) How are IT costs reimbursed?  
 (a) From a budget funded by a corporate division.  
 (b) Through chargebacks to the business units.  
 (c) Through revenues earned as a profit center.  
 (d) None of the above. Please describe.
- (12) On the scale below, indicate to what extent IT resource allocation at the company-wide level is determined by corporate IT or by the business units:  
 IT department                    1 2 3 4 5                    Business units
- (13) On the scale below, indicate to what extent IT resource allocation at the local level is determined by corporate IT or by the business units:  
 IT department                    1 2 3 4 5                    Business units
- (14) On the scale below, indicate to what extent IT project scheduling at the company-wide level is determined by corporate IT or by the business units:  
 IT department                    1 2 3 4 5                    Business units
- (15) On the scale below, indicate to what extent IT project scheduling at the local level is determined by corporate IT or by the business units:  
 IT department                    1 2 3 4 5                    Business units
- (16) On the scale below, indicate whether corporate IT or the business units operate information technology services?  
 IT department                    1 2 3 4 5                    Business units

*Specific questions about IT standard-setting in your company*

*Note:* IT standards are defined as allowable characteristics for information processing and communication hardware and software acquired or developed by the company.

- (17) On the scale below, indicate the extent to which technological expertise vs business needs drive standard-setting.  
 Technological expertise                    1 2 3 4 5                    Business needs
- (18) On the scale below, indicate to what extent standard-setting is centralized.  
 Centralized                    1 2 3 4 5                    Decentralized
- (19) On the scale below, indicate whether a corporate IT department or the business units set standards.  
 IT department                    1 2 3 4 5                    Business units
- (20) On the scale below, indicate whether the oversight and enforcement of standards is the responsibility of corporate IT or the business units.  
 IT department                    1 2 3 4 5                    Business units
- (21) Which best describes the influence of corporate IT and the business units in standard-setting?



- (a) IT selects and enforces standards; business units live within standards.
  - (b) IT selects and enforces standards; business units decide timing or can override IT's choices.
  - (c) IT and business units jointly select and enforce.
  - (d) IT recommends to business units and/or support implementation; business units select standards.
  - (e) None of the above. Please describe.
- (22) Which best describes the approach to making decisions about standards?
- (a) It is directive (from corporate IT).
  - (b) It is negotiated among corporate IT and the business units.
  - (c) It is collaborative.
  - (d) It is directive (from the business units).
  - (e) None of the above. Please describe.
- (23) How recently has the process and/or responsibility for setting standards changed?
- (a) More than two years ago.
  - (b) Within the last year or two.
  - (c) Currently changing or soon to change.
- (24) If you answered "b" or "c" to question (23) above, please explain the nature of the changes.
- (25) If you answered "b" or "c" to question (23) above, please explain the reason for the changes.

*Questions about changes in IT structure in your company*

- (26) How recently have you changed the organizational structure of your IT group(s)?
- (a) More than two years ago.
  - (b) Within the last year or two.
  - (c) Currently changing or soon to change.
- (27) If you answered "b" or "c" to the question above, please explain the nature of the changes.
- (28) If you answered "b" or "c" to the question above, please explain the reason for the changes.
- (29) How well does the current structure work for you? What are its strengths and weaknesses?
- (30) Do you have any other comments?

End of questionnaire

We are grateful for your willingness to complete and return this questionnaire.