Reconceptualizing the Context-Design Issue for the Information Systems Function

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Most of today's organizations are struggling with the task of devising appropriate designs to enable the successful pursuit of their strategies, given their competencies, within their particular environmental context. This manuscript provides an elegant set of arguments which should enrich the thinking of both scholars and executives regarding the decision to centralize or decentralize decision responsibilities for a set of organizational activities. While these arguments are couched in terms of a firm's application development activity, the core arguments are salient to most organizational activities.

Robert W. Zmud

Abstract

The authors develop theory for predicting the distribution of decision making between the corporate and business-unit levels of management for a subset of information systems (IS) resources referred to as systems development. Drawing on literature from the fields of MIS, strategic management, and organization theory, they first determine how potentially influential context factors are likely to affect the locus of the lead decision-making role from a multiple-contingencies perspective. Then they theorize how conflicting corporate and business-unit contingencies are likely to be resolved. They present a set of six propositions that predict a centralized, decentralized, or compromise design solution for a given business unit on the basis of (1) business-level strategy, (2) whether or not information technology (IT) plays a strategic role for the business unit, (3) the degree of line managers' IT knowledge at the business-unit level, and (4) the level at which opportunities for IT-related synergies across business units are being pursued at the corporate level.

(Organization Design; Structure of the IS Function; IS Centralization/Decentralization; IS Alignment)

Introduction

On a fine spring morning, Bob pulled into the Gas'N'More station to peek at the display shelves and see how friendly the cashier was. Satisfied with his findings, he drove on to his new company headquarters building. Bob had been the president of the Gas'N'More division since it and a sister division (Lube-It-All) had become independent divisions two years earlier. The corporate parent—a petroleum firm—had a decade-long history of increasing autonomy for all divisions, so Bob had complete control over critical resources; operations, marketing, human resources, and information systems analysts and programmers were his to muster at will.

Gas'N'More was a rising "star" within the corporate portfolio. A Big Six consulting team was finishing up a strategic plan for Bob, and several exciting initiatives had surfaced—including plans for new information systems to help gain market share in the gas/convenience retail industry. Bob knew that he hadn't spent enough on information technology (IT) in the last few years, and the dozen or so information systems (IS) people he had inherited from the petroleum group two years earlier had mostly been making changes to old systems, not developing new ones. But he had full control over all systems development resources for Gas'N'More. (The data centers and telephone lines were run by a large central IS unit for all corporate divisions.) He was confident that he could easily entice some young, bright graduates from the nearby university to join the division once they heard of his plans to make the IS group a major player with a strategic role. . . .

By summer, the situation had radically changed. The V.P. for administration who was responsible for systems development at Gas'N'More had resigned. Even before his resignation, the Big Six consultants had expressed concerns about the ability of Bob's management team to shepherd the company through the

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development of a new point-of-sale system. The risks of a strategy based on new systems developed by programmers who had little experience with microcomputer applications loomed larger than it had just a few months ago. Bob also knew that Lube-It-All (the sister division) was well on its way toward implementing a new (EDI) application that would directly link it with one of its major customers, and the development work had all been done by a systems development group in the central IS unit. When Bob had jumped at the chance to have his own systems development group two years ago, the president of Lube-It-All had taken a different course: he had gone all the way to the CEO for approval to move the division's systems development responsibilities to the central IS group as an "exception" to corporate policy.

Shortly after receiving his V.P.'s resignation, Bob made an appointment with the chief information officer who headed the central IS unit. As he made his way to the CIO suite, he wondered whether he, too, should request an exception to corporate policy, and ask the CIO to take control of his systems development resources.

The organization design issue here is *the distribution of decision making between the corporate and business-unit levels of management for the information systems function.* Identifying the best design solution for business units such as Gas'N'More (a true story) has become a critical management concern as the potential of information technology (IT) applications to influence the growth and survival of a business has come to be recognized (e.g., Clemons 1991, McFarlan 1984, Porter and Millar 1985, Rockart 1988). Yet despite 30 years of empirical research and management theories on organizational alignment, and a decade of MIS research on the alignment of the information systems (IS) function from a context-design fit perspective, *we still have too many gaps in our knowledge to predict the best design solution for Gas'N'More.*

First, whereas management researchers have shifted to a multivariate perspective in response to criticisms of bivariate studies of organization design (e.g., Miller 1986, Schoonhoven 1981), MIS researchers have generally persisted with bivariate studies at the overall organization level and concentrated on structural variables at the expense of strategy variables (Henderson and Venkatraman 1992, Weill and Olson 1989). Second, MIS researchers have ignored IS-related capability factors such as IT management knowledge on the part of business managers (Brown and Magill 1994, Earl 1989, King 1983). Third, management researchers have begun to explore contingency variables at the business-unit level because enterprise-level variables alone have failed to fully explain organizational designs (e.g., Golden 1992; Govindarajan 1986, 1988, 1989; Gupta and Govindarajan 1984). For the most part, however, MIS researchers have ignored "traditional" contingency context factors *at the business unit-level,* such as competitive strategy (Allen and Boynton 1991, Tavakolian 1989). Finally, none of the MIS researchers has taken a *multiple-contingencies approach* and attempted to identify the best IT decision-making solution when corporate-level and business-level contingency factors *are in conflict.*

Therein lies our motivation for our article: *to develop a simple, yet more encompassing, theory that predicts IT decision-making solutions for business units in large, multidivisional firms.* We first introduce some terminology to help us talk across disciplines, summarize recent trends in the distribution of IT decision making between the corporate and business-unit management levels, and review "what we know and don't know" from prior MIS research on the context-design fit issue. Then we introduce a simplified example to illustrate the use of a multiple-contingencies lens to help us reach our objective.

What We Know and Don't Know from the MIS Literature

The organizational alignment of a function such as information systems poses an inherent design conflict in large, multidivisional firms: the need to respond to both corporate and business-unit stakeholders. The distribution of IT decision making between the corporate and business-unit management levels is therefore a key design issue. Although still portrayed in centralization-versus-decentralization terms (Alter 1996, Marais 1995), the current state of affairs is really much less monolithic.

Terminology

Before discussing IT decision-making trends, we need to define certain terms. First, for a staff function such as information systems (formerly data processing), a *centralized design* is present when decision authority resides primarily with corporate IS managers (or other central IS unit). A *decentralized design* is present when decision authority resides primarily with business-unit managers. Second, the literature indicates consensus that there are two different sets of IS decisions (e.g., Brown and Magill 1994, Dixon and John 1989, King 1983, Olson and Chervany 1980, Zmud et al. 1986). One set concerns capital investment, resource allocation, and operational decisions for the *C&C infrastructure*—computer and communications/network operations and infrastructure planning activities. The second set concerns capital investments, resource allocation, and operational decisions for *systems development*—application planning, software

acquisition (development or purchase), and maintenance. (We view the outsourcing of one or more IS subfunctions as a make-or-buy decision that is independent of the issue we address, the distribution of IT decision making.)

Recent Trends

With the preceding terminology, we can examine four trends documented in the IS literature (Allen and Boynton 1991, Alter 1990, Brown and Magill 1994, Clark 1992, Dixon and John 1989, Earl 1989, Maglitta and Mehler 1992, Von Simson 1990).

Trend 1: Centralized IT Decision Making for the C&C Infrastructure. Viewing the C&C infrastructure as a central "utility" (e.g., Cash et al. 1988), firms have been consolidating their data centers and networking operations under centralized (corporate) management to exploit economies of scale and scope. Uninterrupted service, connectivity, and cost efficiencies are the primary measures of operational performance. The petroleum firm in our vignette was actually a trend-setter here: the C&C infrastructure responsibilities have resided in a central IS unit that is part of a larger "shared services" organization since the early 1980s. The growing usage of electronic products (e.g., e-mail, Lotus Notes) to support communication and coordination across divisional and geographic boundaries suggests that efficiency and connectivity benefits from the sharing of C&C resources will continue to be sought by large, multidivisional firms.

Trend 2: Decentralized IT Decision Making for Systems Development. Trend 2 suggests that the cost drivers for trend 1 are outweighed by the benefits accruing from separate systems development activities under business-unit control. As seen in our vignette, it is technologically feasible for systems-development decision making to be centralized or decentralized when the C&C infrastructure is centralized. Decentralized design takes advantage of major technological advances of the past decade, such as increasingly powerful microcomputer tools for rapid systems prototyping. The MIS literature suggests that the driver for decentralization is business-unit control over what has become a strategic resource—that is, IT has come to play a strategic role at the business-unit level. Trend 2 also matches the overall trend among European and U.S. firms toward increased decentralization over the past decade (e.g., Abell 1993).

Trend 3: Federal Form of IT Decision Making (Trend 1 Plus Trend 2). The federal form of IT decision making, a combination of trends 1 and 2, began to be described in the IS literature in the mid-1980s (e.g., Zmud et al. 1986). If we view the issue of IT decision-making distribution as finding the best context-design fit in response to potentially conflicting corporate and business-unit contingencies, the federal design is a structural innovation in response to competing multiple conflicting contingencies (Handy 1992). That is, IT decision-making responsibilities are subdivided to yield corporate-level cost efficiencies under a centralized C&C infrastructure, as well as business-level benefits from control of a strategic resource under a decentralized design for systems development.

The petroleum firm in our vignette was a relatively early adopter of a federal form among U.S. multidivisional firms. Systems development resources were decentralized to its major divisions in the early 1980s as part of an organizational restructuring. When two new independent divisions were created a decade later, however, the standardized solution began to break down. An exception was made to the stated corporate policy of decentralized systems development responsibilities for Gas'N'More's sister division.

Trend 4: Different IT Decision Making Designs for Different Business Units in the Same Multidivisional Firm. Trend 4 is qualitatively different from the other three; it signals the abandonment of a uniform (standard) design at the enterprise level in favor of a "customized" approach. Trend 4 firms are not only dividing responsibilities into two sets of decisions, but are also selectively decentralizing systems development—that is, implementing customized solutions. This trend suggests that the cost/benefit tradeoffs between corporate and business-unit contingencies cannot be assumed to be the same across all business units.

A customized approach to IT decision making matches the emphasis on customer responsiveness that has become a hallmark of U.S. firms of the 1990s (Peters 1988). It signals a willingness to satisfy the internal customers of the IS function (business managers) as well as the flexibility to customize solutions for unique business-unit needs (Allen and Boynton 1991). Although implementing customized decision-making designs for different business units leads to higher coordination costs for the enterprise because of increased complexity (e.g., Ghoshal and Nohria 1993, Porter 1985), a growing body of evidence suggests that multidivisional firms in which SBUs are "custom managed" outperform firms that take a uniform approach and force "indiscriminate fit" on all SBUs (Bartlett and Ghoshal 1990, Govindarajan 1986, Gupta 1987). The situation in our vignette may become increasingly common as multidivisional firms recognize the performance benefits from customized approaches to staff functions such as IS.

The Contingency Factors

Let us now turn to "what we know and don't know" about contingency factors with which IT decision-making designs are aligned. As can be seen in Table 1, MIS research

Table 1 MIS Literature on Context-Design Issue

Empirical Study	Context: Enterprise Level	Context: Business-Unit Level	Design: Locus of IT Decision Making	Significant Findings for Context-Design Relationships
Bivariate Studies				
Ahituv et al. (1989)	Size (employees) Overall firm structure (formal structure, decision-making process) Industry		C&C infrastructure (locus of processors)	Overall firm structure: Significant positive relationship between centralization of decision making process and centralization of C&C infrastructure
Ein-Dor and Segev (1982)	Size (revenues) Overall firm structure (decision-making locus) Psychological climate (toward IS) Time frame (planning)		C&C infrastructure (hardware deployment) Systems development and implementation	Overall firm structure: Significant positive relationship between centralization of decision making and centralization of (1) C&C infrastructure, (2) Systems development Size: Significant negative relationship between revenues and centralization of (1) C&C infrastructure, (2) Systems development
Olson and Chervany (1980)	Size (employees) Overall firm structure (centralization of authority, standardization, formalization, line control of workflow, functional specialization, perceived power of IS)		Systems operations Systems development Systems management	No overall patterns discernible (15 of 78 bivariate relationships significant)
Tavakolian (1989)		Competitive strategy (Miles and Snow typology)	IT operations IT development IT administration	Competitive strategy: Defender strategy associated with centralization of (1) C&C infrastructure, (2) Systems development, (3) IT administration
Multivariate Studies				
Brown and Magill (1984)	Four categories of factors: Overall organization IS organization IT investment External environment	Some factors measured at business-unit level, but reported as aggregate, e.g., Overall organization Business strategy IT management expertise IT investment Strategic grid	IS governance forms: Highly centralized Highly decentralized Federal hybrid Split (systems development centralized for some units, decentralized for others)	Overall organization factors explain highly centralized, highly decentralized, and change to federal hybrid. Deficiencies in IS performance capabilities under a federal hybrid design explain change to split design
Clark (1992)	Size Industry Other organizational characteristics		IS governance forms: Centralized Dispersed (location only) Decentralized	No discernible relationships
Earl (1989)	Overall firm structure (organization structure, management control systems) Organization culture IT heritage		IS governance forms: Centralized Decentralized Federal Business unit (business within a business) Business venture (also external clients)	Overall firm structure: Centralized form associated with centralized context or functional structure Decentralized form associated with decentralized context and holding companies Federal form associated with matrix hybrid structures in multidivisional companies

has focused almost exclusively on enterprise-level context variables. Two related assumptions underlie that research stream: (1) firms implement a uniform IT decision-making design across all business units and (2) all predictor variables can be captured at the overall organization level. Although trend 4 and our vignette are evidence that at least the first assumption no longer holds true, the literature does inform us of enterprise-level contingencies with which to predict *uniform* centralized or decentralized designs for the IS function.

First, a highly centralized locus of IT decision making (for both C&C infrastructure and systems development) is associated with a more centralized overall firm structure (e.g., Ahituv et al. 1989, Earl 1989) and, in the Miles and Snow (1978) typology, a "defender" competitive strategy (Tavakolian 1989). Second, a highly decentralized locus of IT decision making is associated with a corporate strategy of unrelated diversification (Brown and Magill 1994) and a decentralized overall firm structure (e.g., Ahituv et al. 1989, Earl 1989).

Evidence also suggests that firms with a corporate strategy of related diversification and an SBU structure will implement either a highly centralized or a highly decentralized locus of IT decision making for systems development, *or both* (Brown and Magill 1994). In other words, the MIS research from a structural contingency approach does not explain well why firms would choose a uniform IT decision-making design for systems development across all business units rather than a customized design (trend 4). From a business-unit perspective, then, we cannot predict the "best design" for Gas'N'More at the time of our vignette on the basis of the literature, nor can we explain why Gas'N'More and Lube-It-All implemented different IT decision-making solutions two years previously.

In pursuit of theory to explain trend 4 and our vignette, we next turn to management research that will help us to reconceptualize the context-design issue for the IS function from a multiple-contingencies perspective.

A Multiple-Contingencies Lens (and Simplified Example)

A multiple-contingencies perspective recognizes that organizational designs are attempts to respond to multiple factors, and that satisfying the demands of every contingency equally well may be impossible (Gresov 1989; see also, e.g., Drazin and Van de Ven 1985, Thompson 1967). In fact, for most large organizations, *conflicting* contingencies are the rule rather than the exception (Child 1975, Gresov 1989). A multiple-contingencies perspective, then, is not merely concerned with identifying influential context factors, but also addresses the more intriguing issue of resolving design conflicts generated by multiple contingencies.

Building on earlier "classic" research, Gresov (1989) proposes four alternative approaches for reconciling conflicting contingencies, which we have restated in Table 2. In Gresov's first approach (conflicting contingencies), no optimal solution is found to resolve the conflict; a suboptimal design results in low performance. An optimal design solution is implied in the other three approaches. Empirical support (based on cross-sectional data at the work-unit level) is reported for the first two approaches (conflicting contingencies, dominant imperative). Further, Gresov argues that the resolution-by-redesign approach is a *long-term* solution in the absence of a dominant contingency factor. Indeed, the emergence of the federal design for IT decision making, introduced in the last section as trend 3, is an example of a resolution-by-redesign approach. Neither the resolution-by-redesign nor the resolution-without-redesign approach was tested by Gresov, as they require longitudinal data.

A simplified example illustrates the general organizational design quandaries that arise because of conflicting corporate and business-unit level contingencies. (We subsequently present a more complex and realistic assessment of conflicting factors.) At the corporate level, recent research has examined the implications for multibusiness firms of pursuing a strategy of either unrelated or related diversification (e.g., Campbell et al. 1995, Very 1993). Firms pursuing unrelated diversification take a portfolio approach to risk management, and tend to adopt decentralized designs consisting of highly autonomous business units (e.g., Hill and Hoskisson 1987, Keats and Hitt 1988). Firms pursuing related diversification seek to gain financial rewards from the cross-unit sharing of tangible or intangible resources (e.g., Kanter 1989, Porter 1985, Very 1993), and tend to adopt centralized designs (e.g., Hoskisson et al. 1993, Kanter 1989).

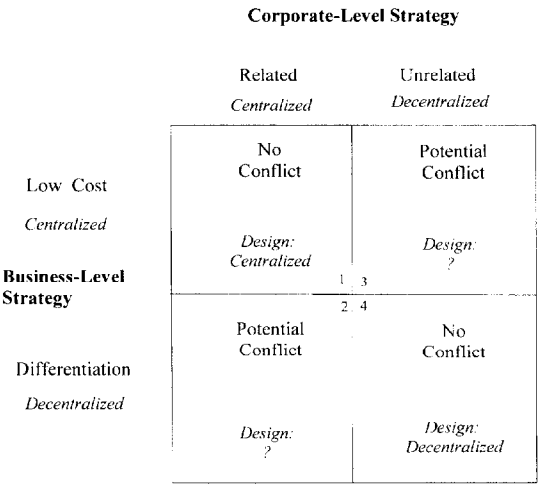
We keep to a simplified example by assuming that all business units pursue the same strategy. Porter's (1980) generic typology suggests that a business unit's competitive strategy will revolve around either *differentiation* (the creation of products that are "perceived industrywide as being unique") or attaining the *low cost* position within the industry. Low cost strategies tend to be accompanied by centralized designs that minimize costs by facilitating sharing across business units, whereas differentiation strategies are best served by decentralized designs that foster market awareness and responsiveness (Govindarajan 1988, Miller 1988).

Figure 1 illustrates the organizational design conflicts that can arise from the two strategic contingencies. For firms pursuing a related-diversification strategy in which

Table 2 Four Alternative Approaches for Reconciling Conflicting Contingencies (Gresov 1989)

1. Conflicting contingencies	Assumptions:	Context is "given" and conflict is "inevitable." Because an optimal design, or fit, cannot be achieved, there will be a negative impact on performance
	Action:	Adopt a modified (vs. pure) centralized or decentralized form
2. Dominant imperative	Assumptions:	"Context is given," but conflict is "less consequential" because one of the conflicting context factors will dominate
	Action:	Choose design to match the dominant contingency factor
3. Resolution by redesign	Assumptions:	Context is "given over the short term, but subject to change through organizational redesign"
	Action:	Evolve "substructures" within a unit, or subdivide unit responsibilities, to resolve the contingency conflict
4. Resolution without redesign	Assumptions:	Context is "socially constructed"
	Action:	Use political and "symbolic processes" to "reconstruct" the context to resolve the contingency conflict

Figure 1 Simplified Example of Potentially Conflicting Corporate and Business-Level Contingencies



all business units pursue a low cost position (cell 1), a centralized design is predicted. For firms pursuing an unrelated-diversification strategy in which all business units pursue a differentiation strategy (cell 4), a decentralized design is predicted. However, the contingent designs at the corporate and business-unit levels conflict for firms in cells 2 and 3. The practical concern for managers is how best to reconcile the demands for contradictory designs.

Research Questions and Approach

Let us now return to the unresolved context-design issue raised by our vignette and trend 4: What contingency factors predict uniform versus customized systems development designs for business units in multidivisional firms? Our context-design fit dilemma can be restated as a tripartite research question from a multiple-contingencies perspective:

In large, multidivisional firms pursuing synergies across related businesses:

(1) What *corporate-level contingencies* influence the choice of a centralized versus decentralized locus of IT decision making for systems development for a given business unit?

(2) What *business-level contingencies* influence the choice of a centralized versus decentralized locus of IT decision making for systems development for a given business unit?

(3) What is the locus of IT decision making for systems development for a given business unit *when corporate-level contingencies conflict with business-level contingencies?*

Our theory-building approach is based on the assumption that we can identify independent variables (context contingencies) that cause sources of variation in a dependent variable (IT decision-making design). The primary design variable of interest is the *locus of the lead role,* although we also predict a high degree of *sharing* in decision making in response to competing corporate and business-unit objectives (Brown and Magill 1994, Sambamurthy et al. 1994). Guided by prior research as well as the desire to develop testable propositions (Dess et al. 1993, Venkatraman and Prescott 1990), we initially consider one strategy factor at the corporate level and three factors at the business-unit level (business-level strategy, strategic role of IT for the business unit, IT knowledge of line managers). Our focus on strategy variables rather than structure variables is based on the assumption that the former are dominant contingency variables with which internal consistency is sought (e.g.,

Chandler 1962, Child 1972, Govindarajan 1986). We define each of our major constructs in Table 3.

To clarify our arguments, we use a progressive series of figures juxtaposing pairs of contingency factors. Figure 2 depicts our starting point: each cell represents a design outcome for a pair of potentially conflicting corporate and business-unit contingencies. As summarized in Table 4, we initially assume three design conditions (no conflict, dominant imperative, conflicting) and one of three design outcomes (centralized, decentralized, compromise) based

Table 3 Construct Definitions

IT Decision-Making Design

Business Unit

Within multidivisional firms, a business unit is a division or a strategic business unit (SBU).

Locus of IT Decision Making

The distribution of IT decision making between corporate and business unit managers (including IS units reporting to business managers) for two categories of IS functions: (1) decisions affecting the *C&C infrastructure* (computer and communications/network operations and infrastructure planning activities) and (2) decisions affecting *systems development* (application planning, software development or purchase, and maintenance). Our focus is on two "pure" forms and one "modified" form for the *lead role* for IT decision making for *systems development:*

- *Centralized:* lead role for decision making resides in a corporate IS unit.
- *Decentralized:* lead role for decision making resides in a business unit.

Under the centralized (decentralized) form, there may be a significant advantage to having business unit (corporate) participation in some decision areas. These designs are notated with the qualifier "*but shared.*"

- *Compromise:* neither a pure centralized nor a pure decentralized lead role is implemented.

Corporate-Level Contingencies

Corporate-Level Strategy

Corporate-level strategy addresses the question, "What businesses will we be in?" A critical factor to consider when deciding on the number and types of businesses for the firm is the level of interconnectedness (or diversification) the firm hopes to achieve to maximize firm performance. We limit our consideration to two classifications:

- *Related diversification:* sets of businesses are united by some sort of "fit" whereby firms can share resources and skills across business units to achieve synergy, and/or extend and enhance their core competencies across business units.
- *Unrelated diversification:* sets of businesses are not expected to generate synergies or provide opportunities to extend the firm's core competencies across business units.

Opportunities for IT-Related Cross-Unit Synergies

By definition, firms with related businesses (i.e., pursuing a corporate strategy of related diversification) seek to achieve some types of synergy or other benefits across business units. However, not all firms expect to achieve benefits from the sharing of systems development activities or resources across business units. This variable captures the degree to which opportunities for IT-related cross-unit synergies *for systems development* are being pursued. Corporate expectations for the cross-unit leveraging of tangible and/or intangible resources for systems development are classified at two levels: *high* and *low.*

Business-Unit Contingencies

Business-Level Strategy

Business-level strategy addresses the question, "How will we compete in the businesses we are in?" It defines the strategic approach a business unit will take within its industry. Three generic business-level strategies (adapted from Porter 1980) are considered:

- *Differentiation strategy:* a competitive strategy based on offering products or services perceived to be unique within the industry.
- *Low cost strategy:* a competitive strategy based on attaining the position of low cost producer within the industry.
- *Best cost strategy:* a competitive strategy based on simultaneously pursuing differentiation and the low cost position within the industry.

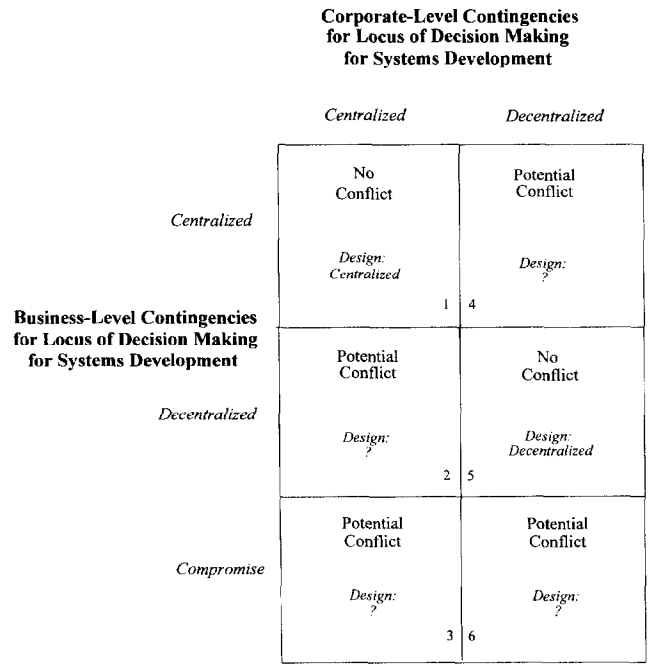
Strategic Role of IT

A general management perception about the degree to which IT plays a competitive role for a given business unit—that is, the potential of IT to influence the competitive characteristics of a given business. A strategic IT role (strategic role = yes) is distinguished from an operational or administrative IT role (strategic role = no).

Line-Manager (IT) Knowledge

The degree to which non-IS managers have IT management expertise based on prior IT-related education and experiences. *High* line-manager IT knowledge implies expertise in decisions related to approving application investments, the monitoring and implementation of systems projects, and a familiarity with IT capabilities from a business manager's perspective.

Figure 2 Initial Framework Showing Influence of Potential Corporate and Business-Level Contingencies



on Gresov's (1989) empirical findings. Because we consider multiple contingency factors at the business-unit level, Figure 2 includes a compromise design as a potential outcome, whereas only centralized or decentralized outcomes will result from the single corporate-level contingency. Our intellectual deliverable is six propositions derived from our final figure (Figure 6) that predict IT decision-making designs for systems development within multidivisional firms pursuing synergies across related businesses.

Theory Development

Corporate Level

Corporate-Level strategy is a dominant variable at the overall organization level because of its interlinkages with and pervasive influence on a multitude of other corporate-level factors. For example, it reflects environmental demands (Chandler 1962, Lawrence and Lorsch 1967) and has a strong influence on overall organizational structure (Chandler 1962, Hill and Hoskisson 1987, Keats and Hitt 1988, Rumelt 1974). Of primary interest to strategic management researchers has been the extent to which a firm expects to achieve synergies across its business units (Gupta and Govindarajan 1984, Porter 1985). Firms have historically pursued *unrelated* diversification to reduce their financial risk. Because the achievement of synergies across business is not an inherent motivating factor guiding the firms' portfolio-creation process, activities tend to be highly decentralized to autonomous business units (e.g., Hoskisson et al. 1993, Kanter 1989, Porter 1980, Rumelt 1974). As seen in our review of MIS contingency research, firms with an unrelated diversification strategy tend to implement decentralized IT decision making for the C&C infrastructure and therefore also for systems development.

Conversely, firms employing a *related* diversification strategy expect to reap benefits based on sharing of tangible resources (such as a plant, equipment, or a salesforce) or intangible resources (such as managerial expertise or know-how) that leads to economies of scale and scope (Lubatkin and Lane 1996; Porter 1985, 1987; Very 1993). To achieve those multiple organizational benefits, firms are likely to implement a centralized organizational design (Hill and Hoskisson 1987, Hoskisson et al. 1993, Kanter 1989, Keats and Hitt 1988, Porter 1980), including centralized IT decision making for the C&C infrastructure. However, firms with a related diversification strategy implement either a centralized or decentralized design, or both, for systems development (Brown and Magill 1994).

Over the past decade, the corporate-level trend has been a movement away from unrelated toward related diversification strategies (Goold and Luchs 1993, Very 1993); the achievement of cross-unit synergies has been the primary motivator. However, numerous studies have identified the pitfalls associated with this trend, including failure to implement cross-unit ties, linking nonsignificant resources, turf wars associated with sharing, and both coordination and "inflexibility" costs (e.g., Kanter 1989, Kazanjian and Drazin 1987, Lubatkin 1983, Porter 1985, Reed, and Luffman 1986). As pointed out by Nayyar and Kazanjian (1993), "the *potential* for synergy does not imply that synergy will *actually* be realized." Nevertheless, some empirical evidence suggests that firms pursuing cross-unit sharing have strengthened firm performance (e.g., Robins and Wiersma 1995).

The trend toward related diversification, in combination with the documented difficulties in achieving synergies, provides the contextual linkage to our first two IT decision-making trends. *Centralized* designs for the C&C infrastructure are clear evidence that many firms are achieving corporate-level benefits from the sharing of tangible resources associated with the C&C infrastructure (e.g., computer hardware, operating systems and other systems software, telecommunications equipment and lines, network software, personnel with scarce systems

Table 4 Three Approaches Assumed to Resolve Multiple Contingencies for IT Decision Making

Condition	Description
1. No conflict	Multiple contingencies imply the same locus of IT decision-making solution. A pure centralized or decentralized design is likely to be implemented.
2. Dominant imperative	One of the conflicting context factors will dominate, and the locus of IT decision making will be aligned with that dominant contingency.
3. Conflicting	Multiple contingencies imply different IT decision-making designs, and there is no dominant imperative. Neither a pure centralized nor a pure decentralized solution is an optimal design, so a suboptimal compromise design is likely to be implemented.

programming or communications network expertise). However, *decentralized* designs for systems development are evidence that firms have *not* attempted to leverage across business units (or been able to leverage effectively) either tangible (e.g., application software, structured databases) or intangible (e.g., technology skills, business-specific know-how, IT management expertise) resources associated with systems development.

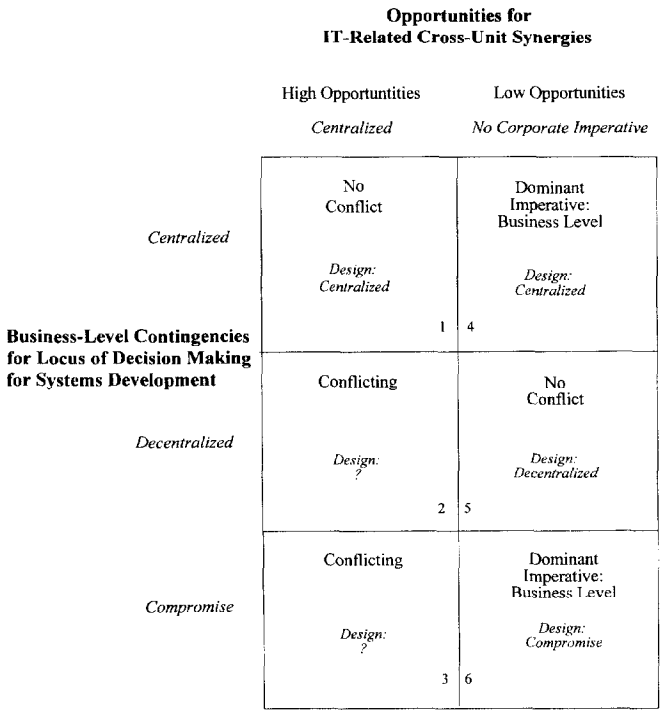
The implication is that the corporate-level strategy variable (e.g., related diversification) is *not the dominant contingency for systems development designs.* In other words, if corporate-level strategy were a dominant imperative, we would be seeing only monolithic centralized or decentralized designs for systems development in practice—not federal or other hybrid forms (trends 3 and 4). Rather, the important corporate-level variable is one that captures a given firm's *opportunities for IT-related synergies across business units* for either the C&C infrastructure or systems development. Recognizing potential differences in relatedness for those two different sets of IS decisions helps explain the diffusion of the federal design (trend 3): when the costs for the pursuit of cross-unit synergies from systems development activities are outweighed by the benefits from business-unit control for systems development, the federal form enables firms to decentralize systems development to their business units without sacrificing the beneficial synergies from the centralized management of the C&C infrastructure.

Further, the concept of relatedness is a source of some controversy today (Goold and Luchs 1993, Very 1993). Rumelt (1974) defines related diversification as businesses with similar products or markets. Researchers in the 1980s defined relatedness as some sort of "fit" whereby firms achieve synergy by sharing resources and skills across business units (Kanter 1989; Porter 1985, 1987). In the 1990s, the emphasis shifted to the sharing of skills, technologies, and know-how in the pursuit of "core competencies," defined as the "sum of learning across individual skill sets and individual organization units" (Hamel and Prahalad 1994). When aptitudes and skills are under business-unit control, cross-unit applications are "difficult" and the "cumulative learning process is slowed." Under corporate leadership, however, the efforts of individuals and teams (e.g., those performing a function such as IS) can become "additive across organizational units," and new core competencies can be created (Hamel and Prahalad 1994).

For the IS function, then, the influential corporate-level variables is the degree to which an enterprise chooses to leverage resources in pursuit of an *IT-related* competency. In the contemporary management literature, new information technologies have been associated with increased opportunities for leveraging intangible resources such as skills and know-how across business units (Davidow and Malone 1992, Hill and Jones 1992). The IT trends documented in the MIS literature toward client/server architectures, integrated systems to support global processes, and the sharing of quantitative and qualitative data via data warehouses and "knowledge management" tools suggest that the opportunities for leveraging IT-related synergies *from systems development activities* across business units have also increased. We do *not* contend that firms would label their corporate strategy as related diversification solely on the basis of a shared asset such as a data warehouse. Rather, we propose that different *types* of relatedness must be considered in assessing the impact of corporate-level strategy on the design of a function such as IS. That is, it is important to distinguish between (1) corporate-level objectives based on opportunities for *IT-related* cross-unit synergies and (2) those based on opportunities for cross-unit synergies *not* related to the IS function. Markides and Williamson (1996) would call that "unpacking" the relatedness concept.

In Figure 3 we, therefore, propose that a firm's opportunities for IT-related cross-unit synergies constitute the relevant corporate-level contingency factor for the locus of IT decision making for systems development. In firms

Figure 3 **Framework of Corporate and Business-Level Contingencies, Introducing Corporate-Level Contingency Factor**



with *high opportunities* (cells 1, 2, 3), a centralized design is more likely. In firms with *low opportunities* (cells 4, 5, 6), there appears to be *no corporate imperative.* For the latter cells, then, the business-level contingency will be the dominant imperative, and the design solution implied by the multiple-contingency outcome at the business level is likely to be implemented. As there is no contingency conflict for cell 1, the design solution remains unresolved only for business units in cells 2 and 3. We also argue that, given the contemporary strategic management and IT trends, business units will be increasingly likely to be positioned in the high-opportunities cells in the future.

Business-Unit Level

At the business-unit level we consider three potential contingency factors: business-level strategy, strategic role of IT for the business unit, and line-manager IT knowledge. We examine the issues of context-design fit for those three factors separately before introducing potential conflicts with corporate-level contingencies.

Business-Level Strategy. The competitive strategy of a business has been argued to be the "preeminent source" of contingency in multidivisional firms (Govindarajan 1986). The variables found to be aligned with one or more business strategy dimensions include environmental instability and uncertainty, the technology used by the business unit, the structure of the business unit, its information-processing capacity, and its coordination mechanisms (Golden 1992; Govindarajan 1988; Hambrick 1985; Miles and Snow 1978; Miller 1986, 1988; Mintzberg 1979; Porter 1980; Tushman and Nadler 1978). Two "equivalent" typologies have dominated management research (Miller 1988): Miles and Snow's (1978) defender-prospector continuum and Porter's (1980) low cost–differentiation types. Porter's typology is adopted here because of its widespread acceptance and predominance in the management literature.

Differentiation strategies tend to be adopted under conditions of high environmental uncertainty (Govindarajan 1986, Porter 1980), which leads to increased information needs (Miller 1988) to facilitate market awareness and responsiveness (Golden 1992) to increasingly sophisticated customers (Liedtka 1996). Those needs are often best served by a decentralized structure (Govindarajan 1986, 1988). *Low cost* strategies are used in more stable environmental conditions (Miller 1988, Porter 1980) with a strong focus on internal efficiencies (Golden 1992). In order to minimize costs, sharing across business units is common; this leads to higher centralization of activities than is present with differentiation strategies (Govindarajan 1986, 1988).

However, the contemporary literature suggests that the low cost versus differentiation dichotomy is a false one today, as some business units are effectively pursuing both strategies simultaneously (Davidow and Malone 1992, Hill 1988, Quinn 1992) to achieve low cost and high value (Abell 1993). Technological advances such as those providing mass customization (Pine et al. 1993) also make possible the pursuit of a dual business strategy (Hill and Jones 1992), although not without high risk of failure (Hitt et al. 1995). We adopt the term "*best cost*" for this third potential competitive strategy (Thompson and Strickland 1995).

The important question for predicting the systems development design then becomes: How do systems development activities relate to a business unit's strategic capabilities? Systems development activities influence the way in which the C&C infrastructure is actually *used* within a business unit. Management decisions for systems development activities can *promote or constrain* the differentiation of a business unit's product or service and/or the achievement of cost economies.

As seen in Table 1, we found no MIS literature examining the relationship between a business unit's strategy and the locus of decision-making for systems development for that business unit. However, from the

management literature we can infer that business units pursuing a low cost strategy would be likely to implement a centralized design because of economies of scale or scope from the sharing of resources. Business units pursuing a differentiation strategy would be more likely to implement a decentralized design to ensure business-unit control of software development resources that enable it to be unique in the marketplace.

Because the demands that differentiation and low cost strategies place on an organization are typically contradictory (Hill 1988), business units pursuing a best cost strategy appear to face some major tradeoffs in the choice of an IT decision-making design. Clearly, neither a pure centralized nor a pure decentralized locus of decision making for systems development would appear to provide the best fit. Although units pursuing a best cost strategy appear to rely heavily on cross-functional teams (Hitt et al. 1995)—which implies *shared* IT decision-making responsibilities between the corporate and business-unit levels—the optimal design choice for that business-level strategy can only be speculated.

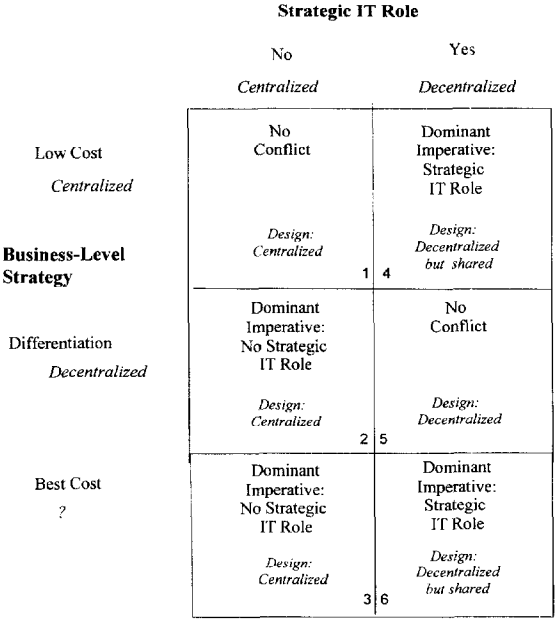
However, the contemporary management literature provides evidence that business units devote their attention only to functional activities that are central to their strategy; the benefits of controlling a resource must outweigh the costs. Functional activities not central to their strategy will be centralized to a corporate-level unit or given minimal attention (Galbraith 1973, Golden 1992, Govindarajan 1986, Nayyar and Kazanjian 1993, Tushman and Nadler 1978). The implication is that *business strategy alone is insufficient* for predicting IT decision-making designs: business units in firms with related businesses will seek IT decision making for systems development resources *only if IT plays a critical role for their own strategy.*

Strategic Role of IT. The degree to which IT plays a strategic role for a given business is assumed to vary between industries, within a given industry over time, and within a given business over time (Benjamin et al. 1985, Cash et al. 1988, Cash and Konsynski 1985, Jarvenpaa and Ives 1991, McFarlan et al. 1983). Examples of how the use of IT can change a firm's product or service or the way a business competes in an industry, along with normative frameworks for identifying opportunities for "strategic information systems" for competitive advantage, became widespread in the MIS literature by the mid-1980s (e.g., Ives and Learmonth 1984, Porter and Millar 1985, Wiseman 1985).

Although we have only initial empirical evidence for the relationship between the strategic IT role variable and the locus of IT decision making for systems development (Brown and Magill 1994), resource dependency theory provides a theoretical explanation for this context factor being an influential variable at the business-unit level: business units seek autonomy and avoid dependence on other organizational units for control of critical resources (Hickson et al. 1971, Pfeffer and Salancik 1978). For example, if systems development activities play a critical role in marketplace adaptability, resource dependency theory predicts that the lead role resides with business-unit managers.

Figure 4 juxtaposes the dichotomous design outcomes for the two strategic contingency variables at the business-unit level. For cells 1 and 5 there is no conflict, but the other four cells have a potential contingency conflict. We propose that the strategic IT role contingency will be a dominant imperative for all four cells. If IT does *not* play a strategic role for a given business unit (cells 2 and 3), the literature suggests that the unit will not devote its own management resources to systems development activities; a centralized design is predicted, irrespective of the business unit's competitive strategy. If IT *does* play a strategic role for the business unit (cells 4 and 6), a decentralized design is predicted; according to resource dependency theory, the business unit will assume the lead role when IT is critical to its strategy. However, because business units in cells 4 and 6 are also seeking cost economies (low cost or best cost strategy), we also predict a *shared* design solution for those cells: corporate IS participation in some decision areas will help ensure the use

Figure 4 First Framework of Business-Level Contingencies Only, Showing Influence of Two Strategic Contingencies

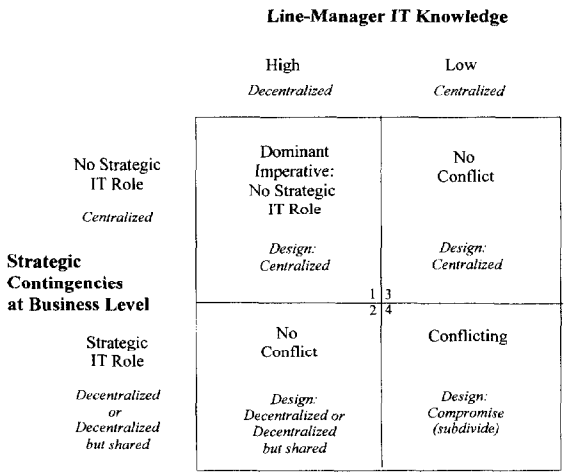


of common tools (e.g., software development tools, database systems, software applications) or the sharing of intangible resources (e.g., technological and business know-how), which in turn will lead to lower costs for the business units.

Line-Manager IT Knowledge. An inherent assumption in our discussion has been that a business unit has the *ability* to manage systems development activities. Yet management researchers provide evidence that the achievement of strategic goals depends on business executives' characteristics. For example, an association between high business-unit performance and "fit" between the general manager's functional background and a business-unit strategy variable has been reported (Govindarajan 1989, Gupta and Govindarajan 1984). Similarly, MIS researchers report that lack of line managers' IT knowledge and experience can constrain the rate at which IT decision-making authority can be decentralized to line managers or lead to a recentralization of decision authority for systems development (Brown 1997, Sambamurthy et al. 1994).

Figure 5 juxtaposes the dichotomous line-manager IT knowledge variable with the strategic contingency outcomes at the business-unit level from Figure 4. We predict that high IT knowledge on the part of business-unit managers is associated with a decentralized design for systems development, whereas low IT knowledge is associated with a centralized design. When IT knowledge is high and IT plays a strategic role (cell 2), there is no conflict; a decentralized design is predicted (or decentralized with sharing to match the business-level strategy, as shown in Figure 4). When IT knowledge is low and IT does not play a strategic role (cell 3), there is also no conflict; a centralized design is predicted. The remaining two cells (1 and 4), however, pose conflicting contingencies.

Figure 5 Final Framework of Business-Level Contingencies Only



When IT knowledge is high and IT does not play a strategic role (cell 1), we propose that the strategic IT role variable will be a dominant imperative, and predict a centralized design. However, in today's business environment of increasing IT investments (Kneale 1994), the conditions modeled for cell 1 may be short lived: either the line manager will move to a position where his or her IT knowledge will be more highly valued, or a strategic IT role will begin to emerge for the business unit. In fact, it seems reasonable that over the long term a resolution-without-redesign approach (see Table 2) could apply in this situation: the line manager will use political processes to identify a strategic IT role for the business unit, resulting in a cell 2 (no conflict) situation.

The remaining cell in Figure 5 is the situation faced by the president of Gas'N'More at the end of our vignette: IT is perceived to play a strategic role for the business unit, but line-manager IT knowledge is low (cell 4). Neither a centralized nor a decentralized design is optimal. Centralization would remove the responsibility for a critical strategic resource from business-unit control. Decentralization would place a critical resource under business managers who lack the requisite skills or experience to manage it effectively. For cell 4 we therefore propose a *compromise design,* although it is likely to result in suboptimal performance (Gresov 1989). A potential compromise solution is to formally *subdivide* systems development responsibilities, so that one or more systems development subfunctions is assigned to the business unit in an attempt to increase the IT management knowledge of business managers. Examples from the MIS literature (e.g., Cash et al. 1988, Earl 1989, Keen 1991, Martin et al. 1994) include playing a lead role in strategic IT planning, chairing division-level steering committees for approving systems development requests, and serving as project manager for specific systems projects. As line managers gain the requisite expertise, a cell 2 (no conflict) situation emerges. Over the long term, then, this compromise design becomes an example of a resolution-by-redesign approach (see Table 2).

The management literature provides some empirical support for achieving strategic alignment by developing current managers rather than selecting new managers (e.g., Kerr and Jackofsky 1989). Absorptive capacity theory (Cohen and Levinthal 1990) also provides a rationale for why a firm would implement a suboptimal (compromise) design: an organization needs "prior related knowledge" to assimilate and use new knowledge, and prior

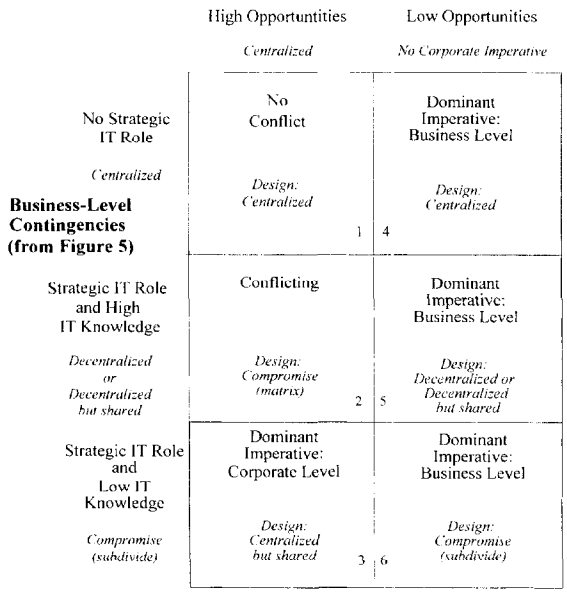
related knowledge can be developed through direct involvement. By investing in the development of internal employees, firms can build on business managers' knowledge about the firm's "idiosyncratic needs, organizational procedures, routines, complementary capabilities, and extramural relationships" (Cohen and Levinthal 1990).

Outcomes from Corporate and Business Levels

We return now to the resolution of potentially conflicting contingencies between the corporate and business-unit levels. In Figure 3 we considered the potential outcomes from the corporate-level contingency variable (high vs. low opportunities for IT-related cross-unit synergies for systems development) with the three design outcomes from multiple contingencies at the business level (centralized, decentralized, compromise). The business-level contingency is the dominant imperative when there are *low opportunities* for IT-related cross-unit synergies (cells 4, 5 and 6). Further, when there are *high opportunities* at the corporate level and the business-level contingent design is centralized (cell 1), there is no conflict. However, when the business-level contingent design is not centralized, conflicts may arise (cells 2 and 3).

Figure 6 combines the predictions of Figure 3 with the context-design outcomes at the business level of Figure 5. We now can see that the difference in context contingencies for cells 2 and 3 is high versus low line-manager IT knowledge. In cell 3, a compromise design (with some systems development subfunctions assigned to business managers) is implied by the two business-level factors (strategic IT role, low IT knowledge), but a centralized design is implied by the corporate contingency. We propose a centralized design for business units in cell 3. Because the corporate objective is to leverage systems development resources across business units, decision making for systems development will be centralized for business units that lack IT management knowledge to provide enterprise-level and cross-unit IT management expertise. However, we also propose that business-level pressures for direct involvement in IT decision making in order to gain IT management expertise will result in some shared IT decision making (i.e., business management participation).

Figure 6 Final Framework of Corporate and Business-Level Contingencies for Locus of Decision Making for Systems Development



The remaining cell in Figure 6 (cell 2) represents the situation of greatest conflict. Here, the contingencies at the business-unit level (strategic IT role, high IT knowledge) imply a decentralized design, whereas the corporate-level contingency implies a centralized design. The IS alignment dilemma for the enterprise is: To what degree can IT decision making be decentralized to a business unit without jeopardizing the objective of synergies at the corporate level? In turn, the IS alignment dilemma at the business-unit level is: To what degree can IT decision making be centralized without jeopardizing performance objectives at the business-unit level? The contemporary literature suggests that the number of business units facing competing corporate and business-unit objectives for systems development resources will increase in the next decade as the role of IT grows in strategic importance, line managers increase their IT management knowledge through experience, and firms seek to develop corporate-level competencies for the IS function. Whereas competitive advantage has tended to accrue at the business-unit level in the past decade (Porter 1987), in the coming millennium competitive advantage (and survival) will also accrue from transferring learning and best practices across organizational units (Hamel and Prahalad 1994). In other words, whereas the IT decision-making trend in the past decade has been toward cell 5 (trends 2 and 3), in the next decade the trend will be toward a cell 2 position as both corporate and business managers attempt to exploit IT.

For cell 2 we, therefore, predict a compromise design in the form of a *matrix design*—a "two-boss" structure in which managers with lead roles for systems development are equally accountable to corporate and business-level managers. Although notoriously difficult to implement in the 1970s and early 1980s (Davis and Lawrence 1978, Larson and Gobeli 1987), matrix designs are associated

today with "horizontal strategies" (Hamel and Prahalad 1994, Hill 1994) in which cross-unit collaboration is the desired meta capability (e.g., Ghoshal and Bartlett 1995, Liedtka 1996). Although beyond the scope of this paper, several integrating mechanisms have been prescribed as tactics to build "flexible" matrix structures that avoid past implementation problems—for example, cross-functional teams and incentive systems that reward cooperative behaviors (Hill 1994). Undoubtedly, firms will be increasingly likely to implement matrix designs in response to competing corporate and business-level contingencies for a function such as IS.

Propositions

On the basis of the cells in our final figure (Figure 6), we now formulate six propositions that predict the best design solution for business units such as Gas'N'More.

In large, multidivisional firms pursuing synergies across related businesses in which there are *high opportunities* for IT-related cross-unit synergies for systems development:

P1. *Business units in which IT is not perceived to play a strategic role will implement* centralized *IT decision making for systems development.*

P2. *Business units in which IT is perceived to play a strategic role and line managers have high IT knowledge will implement a* matrix design *for IT decision making for systems development.*

P3. *Business units in which IT is perceived to play a strategic role and line managers have low IT knowledge will implement* centralized but shared *IT decision making for systems development.*

In large, multidivisional firms pursuing synergies across related businesses in which there are *low opportunities* for IT-related cross-unit synergies for systems development:

P4. *Business units in which IT is not perceived to play a strategic role will implement* centralized *IT decision making for systems development.*

P5. *Business units in which IT is perceived to play a strategic role and line managers have high IT knowledge will implement* decentralized *IT decision making for systems development.*

P5a. *Business units pursuing a low cost or best cost competitive strategy will implement more* shared *IT decision making than business units pursuing a differentiation competitive strategy.*

P6. *Business units in which IT is perceived to play a strategic role and line managers have low IT knowledge will implement a* compromise design *for IT decision making for systems development.*

Conclusions and Implications

Our objective was to develop a simple, yet more encompassing, theory to predict the locus of the lead role for systems development decision making for business units like Gas'N'More. Using management theory and empirical findings from strategy, organization theory, and MIS research, we took a multiple-contingencies approach to address the gaps in our knowledge. We identify three contingency factors as influential predictors: one corporate-level factor (opportunities for IT-related cross-unit synergies) and two business-level factors (strategic IT role, line-manager IT knowledge). The business-level strategy variable is theorized to be a predictor of the degree to which systems development responsibilities are shared with corporate when the locus of decision making is decentralized (see P5a).

We began our theory development with the assumption that multiple contingencies for IT decision making will yield one of three design conditions: no conflict, dominant imperative, or conflicting contingencies (see Table 4). We subsequently also identified situations in which the two *long-term* approaches initially identified by Gresov (and summarized in Table 2) could be applied effectively at the business-unit level: resolution-by-redesign and resolution-without-redesign. This suggests that our initial three "short-term" and the two long-term approaches are all potentially valid, as summarized in Table 5. We encourage other researchers to join us in exploring the validity and completeness of the expanded list. Possibly the five approaches are applicable also for resolving conflicting contingencies associated with the distribution of decision making between the corporate and business-unit levels for other functional areas.

Although our thrust is theory development, we think our study affords several insights for practicing executives. First, we recommend that managers conceptualize the distribution of IT decision making as a *context-design fit issue in response to multiple corporate and business-unit pressures.* Second, in their pursuit of the best context-design fit, managers should look for opportunities to resolve contingency conflicts by subdivision and customization. For example, the federal form for the IS function (trend 3) *subdivides* IT responsibilities into two sets of IS decisions to respond to opposing corporate and business-level pressures: a centralized design for the C&C infrastructure in response to corporate-level pressures for cost economies and a decentralized design for

Table 5 Expanded List of Approaches to Resolve Multiple Contingencies for IT Decision Making

Condition	Description
Resolution Approaches for Optimal Impacts in the Short Term	
1. No conflict	Multiple contingencies imply the same locus of IT decision-making solution. A pure centralized or decentralized design is likely to be implemented.
2. Dominant imperative	One of the conflicting context factors will dominate, and the locus of IT decision making will be aligned with that dominant contingency.
3. Conflicting	Multiple contingencies imply different IT decision-making designs, and there is no dominant imperative. Neither a pure centralized nor a pure decentralized solution is an optimal design, so a suboptimal compromise design is likely to be implemented. If the conflicting contingencies are competing corporate and business-level contingencies that are viewed as equally important to the organization, a matrix design is likely to be implemented.
Resolution Approaches for Optimal Impacts in the Long Term	
4. Resolution by redesign	Multiple contingencies imply different IT decision-making designs, and there is no dominant imperative. A suboptimal compromise design is implemented that includes subdivision of the IT decision-making responsibilities, with the intent to change a context factor over time.
5. Resolution without redesign	An organizational member use political processes to reconstruct the context with the intent of eliminating the contingency conflict over time.

systems development in response to business-level pressures for control of a strategic resource. If a uniform solution (such as the federal form) for all business units results in contingency conflicts, *customized* solutions to respond to unique business-unit needs should be considered. Managers can first identify the "best design" on the basis of business-unit contingencies alone (Figures 4 and 5), and then identify the "best design" given the firm's corporate-level objectives for the achievement of IT-related cross-unit synergies (Figure 6). If a centralized or decentralized design is implied, the potential value of some level of *sharing* in decision making should be assessed in light of the business unit's competitive strategy. If a compromise design is implied because of low IT knowledge, consideration should be given to subdividing the systems development responsibilities for the business unit in order to remedy the line managers' deficiency over time.

Indeed, in our vignette, a uniform federal solution for the IS function was abandoned for a customized solution to respond to the unique business needs of two divisions—first Lube-It-All and then Gas'N'More. At the close of our vignette, Bob faced the cell 4 situation of Figure 5: information systems that would play a major strategic role at Gas'N'More had been planned with the help of Big Six consultants, but Gas'N'More's current management team lacked the IT knowledge to manage systems development projects successfully. A compromise design is predicted under the corporate contingency of low opportunities for cross-unit synergies for systems development (P6), and a compromise design solution was implemented at Gas'N'More: the lead role for application planning was established as a Gas'N'More responsibility. The centralized design choice for the other systems development subfunctions was viewed by both IS and business managers as a potentially reversible solution, and increasing the IT-related knowledge of Gas'N'More's business managers was an implementation goal.

We recognize some limitations in our study. In order to undertake a manageable slice, we focused on a limited number of contingency factors as well as dichotomous "pure" design outcomes (centralized, decentralized). Although its scope is justified on the basis of prior research, we recognize the possibility that a critical contingency variable may be unaddressed. Some recently identified variables at the business-unit level include an IS unit size dimension, an IT capabilities variable that takes into account synergies from line managers' IT knowledge and business knowledge of IT personnel, and the geographic proximity of a corporate IS unit to a specific business unit (Boynton et al. 1994, Brown 1997). Research that investigates systems development decision areas from a finer grained perspective may also be required to test our propositions adequately.

Like other MIS researchers, we assumed that a context-design "fit" results in better performance. Although management studies on context-design issues have captured a performance variable at the corporate, business-unit, and work-unit levels (e.g., Drazin and Van de Ven 1985; Ghoshal and Nohria 1993; Govindarajan 1988, 1989;

Gresov 1989; Gupta and Govindarajan 1984; Hill and Hoskisson 1987; Miller 1988; Powell 1992; Rumelt 1974), no related MIS study has included a performance variable. Studies that take into account performance variables at the corporate and business levels are clearly needed, and MIS research on IT investment and usage topics that is based on objective measures could be a useful starting point (e.g., Dos Santos et al. 1993, Harris and Katz 1991, Jarvenpaa and Ives 1990).

Further, our intent was to generate propositions that are ready for testing, but we recognize that considerable work on operationalizations and instrument development is needed for the IT-related constructs in Table 3. For example, we are unaware of any instruments that purport to capture IT-related cross-unit synergies. However, the management literature on synergies from intangible resources (Porter 1985) and competencies for business transformation (Hamel and Prahalad 1994), in combination with the MIS literature on the strategic IT role or IT use (e.g., Schein 1992; Jarvenpaa and Ives 1990, 1991; Tinaikar and King 1995), provides promising points of departure. Similarly, instrumentation for measuring a business manager IT knowledge variable (e.g., Boynton et al. 1994, Sambamurthy et al. 1994) and strategic "fit" (Chan and Huff 1993) has been reported. Research on the impacts of IT on cross-unit sharing for developing IT-related and other core competencies is a related research stream that warrants considerable attention.

We hope our article stimulates researchers to investigate the context-design issues associated with other functional areas (e.g., finance, R&D, accounting, human resources, legal). We found some conceptual discussions of synergies for those "traditional" functions (e.g., Porter 1985), but no empirical research on the identification and transfer of skills across business units for a specific function. At the very least, we hope to generate interest in ferreting out the design contingencies. Our expectation is that a given contingency may be similar across two or more functions, but not necessarily all functions. For example, our field experiences in large, leading-edge firms suggest that the distribution of decision making for the human resources function frequently mirrors the distribution of IT decision making. Whether or not this is due to similar or related contingency factors remains an empirical question. The validity of our theory for research on a function such as human resources therefore awaits investigation by researchers with expertise in that functional area. Indeed, given the current emphasis in the contemporary literature (and the field) on the pursuit of core competencies and capabilities to transform a business or industry through new technologies and organizational learning, context-design research on all staff functions begs the attention of management researchers.

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