

**HORIZONTAL MECHANISMS UNDER
DIFFERING IS ORGANIZATION CONTEXTS**

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Title: HORIZONTAL MECHANISM UNDER DIFFERING ORGANIZATION CONTEXTS

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Abstract: Horizontal mechanisms are structural overlays (such as roles and groups) and non-structural devices (such as physical co-location) that are designed to facilitate cross-unit collaboration. The objective of this study is to increase our cumulative knowledge about what top-down mechanisms are being used to promote the coordination of IS activities across corporate/division boundaries. Propositions about how mechanism usage differs under Centralized versus Federal IS organization contexts are developed based on a synthesis of prior organization science and empirical IS literature. Multiple methods are used to collect data from IS and non-IS senior managers from two case sites with theoretically different IS coordination needs. As predicted, multiple types of structural and non-structural mechanisms were implemented for business-IS coordination in the company with a Centralized IS context, and for corporate IS-decentralized IS coordination in the company with a Federal IS context. An unexpected finding was that mechanisms for *both* of these kinds of IS coordination were valued at each case site. The prediction that a formal group mechanism would be perceived as more effective for achieving cross-unit coordination than an integrator role mechanism was not supported. The article concludes with a discussion of implications for research and practice.

Keywords: Issues in organizing IS, IS management, organization design, steering committees, IS staffing

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INTRODUCTION

In response to increased environmental complexity and uncertainty, today's managers are adopting organizational designs that balance not only the hierarchical tradeoffs of control versus autonomy, but also a third design criterion: collaboration (Applegate 1994). The challenge for managers, then, is to become not only effective vertical strategists, but also horizontal strategists (Mohrman 1993, Porter 1985).

Among the design tools for horizontal strategists are horizontal mechanisms, defined by Mintzberg (1979) as structural and non-structural devices that encourage contacts between individuals in order to coordinate the work of two units. The challenge for researchers is to develop useful ways to categorize these new design tools in order to identify patterns associated with best practices (Mohrman 1993, Nadler et al. 1992).

A trend toward the adoption of new organizational designs that balance the hierarchical tradeoffs of control versus autonomy has also been documented for the IS function (e.g., Brown and Magill 1998, Earl 1996, Rockart, Earl and Ross 1996). In particular, many multi-divisional companies have adopted a Federal design for the IS organization in which IT infrastructure responsibilities are centralized in order to respond to enterprise-level pressures for connectivity and economies of scale, but systems development responsibilities are decentralized to business units in order to respond to division-level pressures for autonomy over strategic IS resources.

Horizontal mechanisms directed at the third design criterion—collaboration—have also been utilized by IS managers. For example, cross-functional teams and liaison roles (Zmud 1988) have been implemented to achieve collaboration not only across IS units and business units, but also across multiple systems development units under a Federal form of IS governance (DeSanctis and Jackson 1994). Yet to date we have not developed useful ways to classify structural as well as non-structural mechanisms for the IS function. We also have little empirical IS research on which to base managerial guidelines.

The objective of this study is to increase our knowledge about horizontal mechanism usage for corporate/division coordination of the IS function as a first step toward theory building and the development of theory-based guidelines for CIOs and other top managers. The overall research questions of interest for this study are: *What horizontal mechanisms are being used to promote collaboration across corporate/division boundaries, and how does mechanism usage compare*

under different IS governance contexts? Unlike prior IS research, a more holistic approach is taken. The intent is to increase our knowledge about the top-down selection of both structural (groups, roles) and non-structural mechanisms, as well as the hierarchical reporting arrangements under which a given mechanism is perceived to be effective.

LITERATURE REVIEW

Prior relevant research by both organization theorists and IS researchers is reviewed in this section in order to provide theoretical grounding for this study. First, selected conceptual research by organizational theorists is discussed. The objectives here are to gain an overall understanding of the theoretical importance of coordination mechanisms as design tools, as well as to identify categories of structural and non-structural mechanisms for achieving collaboration across organizational units. Next, we identify what we know and don't know about top-down mechanisms implemented by CIOs or other top managers to facilitate collaboration across corporate/division boundaries, based on empirical IS research.

Prior Organizational Theory

Horizontal linking mechanisms are organization design innovations that first appeared in the organization theory literature in the 1960s (Mintzberg 1979). According to Mintzberg, horizontal mechanisms are devices designed to encourage liaison contacts between individuals in order to coordinate the work of two units. According to organization theorists of the past two decades, different types of horizontal mechanisms have different cost/benefit tradeoffs (see **Figure 1**). For example, Galbraith (1973) was the first to propose a continuum of horizontal mechanisms based on their increasing ability to handle information. The theoretical tradeoff is that the mechanisms that provide greater lateral information processing and coordination are more costly to implement. As seen in Figure 1, direct contacts between managers afford only modest increases in information processing, but are a simple mechanism with low implementation costs. More costly are *formal groups* for temporary or ongoing problem-solving, such as ad hoc task forces or more permanent teams that have representatives from multiple units, and *formal roles* responsible for collaboration across different departments within an organization, such as lower-level liaison roles and full-time integrating managers. *Matrix forms* can be used to establish dual reporting relationships that ensure high levels of cross-unit collaboration and accountability, although at the highest organizational cost.

All four of the theorists cited in Figure 1 view coordination mechanisms as design tools that are used *in addition to* a firm's hierarchical reporting arrangements to increase coordination, communication, and decision-making across organizational unit boundaries. For example, Galbraith (1994) argues that vertical reporting arrangements focus an organization on its key strategic demands, while horizontal mechanisms provide a more "lateral way of functioning." Thus, no matter which hierarchical structure a firm implements (e.g., centralized, decentralized, or federal), horizontal mechanisms can be used to help remove the barriers to cross-unit collaboration that are created by the firm's reporting arrangements.

The formal mechanisms in the five continua in Figure 1 are remarkably similar. Galbraith's early conceptualization (1973) of the integrating manager role as a mechanism with high information

processing capabilities is also shared by Mintzberg (1979) and Nadler and Tushman (1988). Daft (1992) perpetuates Galbraith's earlier distinctions between lower-level liaisons and full-time integrators, as well as between permanent teams and temporary task forces. However, Daft views permanent teams as capable of higher levels of horizontal coordination than full-time integrators, because teams are not dependent on the "people skills" of a single integrator. Daft also advocates the synergistic usage of multiple mechanisms, such as both full-time integrators and standing teams. Finally, a matrix form is modeled in the three earliest continua as the design mechanism yielding the greatest benefits. In the two most recent continua, however, both Daft (1992) and Galbraith (1994) reconceptualize the matrix form as a structural device that establishes dual reporting arrangements for a given mechanism, and do not include it as a separate type of mechanism. This alternative view may also be in response to the problems associated with matrix form implementations reported in the contemporary management literature (e.g., Larson and Gobeli 1987).

Galbraith's (1994) most recent continuum is published in a monograph that takes a more holistic view of structural and non-structural mechanisms to create a *lateral organization capability*. It is a simplified scheme of two formal structures (integrator roles, formal groups) and an "informal organization." Galbraith defines the informal organization in terms of non-structural design actions that promote voluntary, cooperative problem-solving across unit boundaries and can "provide a foundation" for the formal (structural) mechanisms. Provided in a list in Figure 1 are Galbraith's six "network-building" design practices that improve the likelihood of spontaneous, voluntary contacts for cross-unit problem-solving. The list includes human resource practices, such as job rotation, and interpersonal networking practices, such as physical co-location. Training classes are highlighted as the most common example of an interdepartmental event that can be designed to be a highly effective mechanism for cross-unit relationship building. As described by Galbraith, at the end of a typical multi-day training session, the company not only has people trained on the topic, but also has a group of people "who know each other, and some who will continue their contact" (p.55).

Although two of the continua in Figure 1 include only formal mechanisms (Mintzberg 1979, Nadler and Tushman 1988), the importance of informal mechanisms as horizontal design tools is a notion widely subscribed to by these and other management researchers. For example, Nadler and Tushman (1992) assert that "informal" organization practices can exert considerable influence on behavior. Robey (1991) suggests that socialization to norms and values "occurs most directly through informal interactions," and Ghoshal and Bartlett (1996) describe the usage of informal mechanisms for developing a shared vision across operating units. Mohrman (1993) argues that a "fluid set" of both formal and informal mechanisms is required to achieve lateral integration, and that informal mechanisms offer the advantage of being easier to implement and redesign in highly complex, dynamic situations. Informal mechanisms, including direct contact between managers, have also been prescribed for integrating work across subunits within global firms (Hill 1994).

The specific inclusion of human resource practices in Galbraith's more recent work on horizontal mechanisms (1994) is also supported by other management researchers. Porter (1985) recommends horizontal human resource practices (including personnel rotation among business

units) as devices to facilitate collaboration across business units for competitive advantage. Nadler and Tushman (1992) include human resource management systems and reward systems as part of a "formal organization" component to be designed by the organizational architect. Galbraith's reconceptualization of horizontal linking devices to include an informal organization is therefore consistent with the holistic approaches to organizational design advocated by other management researchers. As a group, these researchers have also proposed the utilization of horizontal mechanisms as not only devices to increase information processing capacity under conditions of high environmental uncertainty, but also as lateral design tools to build and foster the collaborative behaviors requisite for competitive advantage and organizational learning in today's increasingly complex and uncertain business environments (e.g., Lawler 1996, Mohrman 1993). Along with other management researchers, they have also called for the need to learn more about *what combinations of decision-making structures and integrative mechanisms* are most effective (Galbraith et al. 1993, Hill et al. 1992, Lawler 1996, Mohrman 1993).

Prior IS Research

In order to identify what we know and don't know about horizontal mechanism usage for the IS function, IS research published since the mid-1980s was scanned for empirical studies on horizontal mechanisms implemented by CIOs and other top managers to coordinate IS activities across corporate and division boundaries. This literature search uncovered a total of thirteen field studies that collected data on structural overlays or informal mechanisms for the IS function. No empirical studies of human resource practices for the IS function from a horizontal mechanism perspective were identified.¹

As can be seen in **Table 1**, twelve of the thirteen field studies investigate a formal group mechanism, and ten of these studied IS steering committees. The steering committee mechanism typically creates a lateral organization capability between an IS unit and one or more business units. The usage of an IS steering committee with business representatives is associated with several favorable IS outcomes, including effective coordination and integration of IS planning activities (Gupta and Raghunathan 1989), advanced IS budget and planning practices (Doll and Torkzadeh 1987, Saaksjarvi 1994), large systems project selection and monitoring (McKeen and Guimaraes 1985, McKeen, Guimaraes and Wetherbe 1994, Saaksjarvi 1994), and increased managerial support and funding (Doll and Torkzadeh 1987, Torkzadeh and Xia 1992).

Two other field studies (Blanton et al. 1992, DeSanctis and Jackson 1994) describe evidence for the usage of a formal group mechanism to increase coordination across decentralized IS units with systems development responsibilities (i.e., systems development units that report to a business unit) under a Federal design. DeSanctis and Jackson describe a case study (Texaco) in which a formal IS standing team mechanism is implemented after informal mechanisms alone (periodic IT conferences, roundtables) fail to meet the needs for coordination across decentralized IS units. The authors also suggest that when decentralized IS units are geographically separated, groupware support in combination with a formal group mechanism improves the cost/benefit tradeoffs.

¹ The literature on mechanisms at the systems project level, such as cross-functional project teams, JAD sessions, the role and benefits of user participation, was considered a related research stream outside the scope of this study

Only two of the studies in Table 1 (Zmud and Lind 1986, Iacono et al. 1995) captured data on formal roles as corporate/division linking mechanisms. Iacono et al. examined the work practices of relationship managers who reported to a central IS director and were responsible for the IS "accounts" of one or more business clients. These authors conclude that this type of integrator role can be an "easy target" for IS budget cuts because of the difficulties associated with measuring direct outcomes such as improved cross-unit coordination.

The usage of informal (non-structural) mechanisms is reported in three studies. Clark (1992) reports that organizations with centralized IS resources frequently use a physical co-location mechanism by firms with centralized IS resources—i.e., the dispersion of central IS personnel into business areas. As mentioned above, DeSanctis and Jackson (1994) report that informal mechanisms were tried but found to be insufficient for achieving coordination across decentralized IS units under a Federal form.

In summary, the field studies in Table 1 document that formal group overlays are widely used and can be effective top-down design tools to achieve coordination across IS units and business units, as well as coordination across corporate and decentralized IS units. Table 1 also reveals several gaps in our knowledge about mechanism usage. First, none of the prior studies attempts to compare horizontal mechanism usage under different IS governance contexts. Second, we have no evidence of the full range of formal and informal mechanisms implemented within a single firm to achieve either corporate IS-business coordination or corporate IS-decentralized IS coordination. Third, although this body of literature suggests that formal group mechanisms are widely used for cross-unit collaboration, none of these studies captures data on the relative value of a formal group versus a formal role mechanism, let alone the relative value of formal versus informal mechanisms for a given context.

TOWARDS A THEORY OF MECHANISM USAGE

An underlying assumption of the above organization theory literature is that horizontal mechanisms are implemented in order to remove barriers to cross-unit collaboration resulting from hierarchical reporting arrangements. For studies of the IS function, the hierarchical structure of interest is the form of IS governance—i.e., the corporate-business unit distribution of IS decision-making. From the IS alignment literature (e.g., Brown and Magill 1998, Dixon and John 1989, Earl 1996, Zmud et al. 1986), we can predict that the distribution of IS decision-making responsibilities in large, divisionalized companies is an important design issue for two broad resource areas: i) systems development and ii) IT infrastructure (computers and networks). Three governance forms for the IS function currently predominate:

<i>Centralized</i>	A corporate IS unit (or other central unit) has primary authority and responsibility for both IS resource areas.
<i>Decentralized</i>	Business units have primary authority and responsibility for both IS resource areas for their respective unit.

<i>Federal (hybrid)</i>	A corporate IS unit has primary authority and responsibility for IT infrastructure resource decisions, while business units have primary authority and responsibility for systems development resource decisions for their respective unit. The corporate IS unit also typically has an oversight role for the decentralized resources, as well for any multi-divisional systems.
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Based on prior literature, large firms with a *Decentralized* IS decision-making context are least likely to invest in horizontal mechanisms for corporate/division collaboration. Firms with such IS contexts are likely to be firms with highly autonomous business units (Earl 1989) that compete in unrelated businesses (Brown and Magill 1994), and thus have significantly lower opportunities for IT-related cross-unit synergies (Brown and Magill 1998). A corporate level coordination role may not even exist in such firms, and horizontal coordination initiatives may even be voluntary (DeSanctis and Jackson 1994).²

In contrast, large organizations with the other two common forms of IS governance--Centralized and Federal--are likely to invest in horizontal mechanisms for corporate/division collaboration in order to reduce the barriers resulting from these hierarchical structures. This is because companies with Centralized or Federal IS governance forms are likely to be firms that compete in single or related businesses that seek IS cost efficiencies (through economies of scale and standardized infrastructures) as well as cross-unit synergies (Brown and Magill 1998). Both of these IS goals require cross-unit collaboration.

More specifically, under a *Centralized* IS governance form, all IS activities are performed in IS units that report to the same IS management team. Coordination across these IS units (e.g., data center operations, systems development) can be accomplished via the hierarchical reporting arrangements. However, a Centralized governance form also creates what Galbraith refers to as a “dysfunctional effect”: a structural barrier to strong alignment with business management. Top IS managers in Centralized forms are therefore likely to use horizontal mechanisms in order to create a lateral organization capability between corporate IS and the organization’s business units.

Under a *Federal* IS governance form, decision-making responsibilities for IS activities are split between corporate IS and business management: systems development units report directly to business managers, while IS units responsible for the IT infrastructure (computers and networks) report to corporate IS managers. The Federal governance form therefore fosters strong IS-business collaboration through the reporting arrangements for the systems development units. However, a Federal governance form also creates a “dysfunctional effect”: a structural barrier to strong alignment between division IS managers and corporate IS managers. Top IS managers in Federal forms are therefore likely to implement horizontal mechanisms in order to create a lateral organization capability between corporate IS and the decentralized IS units.

² This supposition is also supported by Galbraith (1994) who argues that the corporate-initiated practice of "excessive decentralization" to business units is a major cause of the lack of business unit interest in investing in mechanisms to increase coordination across even related business units.

Development of Propositions Based on Prior Research

Although the empirical IS research on horizontal mechanisms has significant gaps, a synthesis of the findings in Table 1 with the prior organization theory literature does provide some theoretical grounding for preliminary propositions to address our overall research questions: *What mechanisms are being used to promote collaboration across corporate/division boundaries, and how does mechanism usage compare under different IS governance contexts?* The organization theory literature suggests that formal groups, formal roles, and several types of informal mechanisms will be utilized by top IS managers to develop lateral organization capabilities for the IS function. Although the prior IS literature provides only minimal evidence for the range of mechanisms used, it does provide support for the theoretical argument that two kinds of lateral organization capabilities will be found, defined below with a terminology shortcut:

<i>Lateral capability:</i>	<i>Nature of IS coordination:</i>
BU:IS	coordinating activities across business units and IS units
IS:IS	coordinating activities across centralized (corporate) and decentralized IS units

This leads us to our first proposition:

PI: Organizations with Centralized or Federal IS governance are likely to implement multiple types of formal and informal coordination mechanisms to build and sustain a lateral organization capability.

IA: Organizations with Centralized IS governance are likely to implement multiple types of formal and informal mechanisms to build and sustain a lateral organization capability across business units and IS units (BU:IS).

IB: Organizations with Federal IS governance are likely to implement multiple types of formal and informal mechanisms to build and sustain a lateral organization capability across corporate and decentralized IS units (IS:IS).

Further, two categories of formal mechanisms, also referred to as structural overlays, have been identified by organization theorists: formal groups and formal roles. The predominant view among these theorists is that a full-time integrator role mechanism provides greater coordination benefits, and higher implementation costs, than a cross-unit group mechanism. However, Daft (1992) argues that because of the dependence on the people skills of individuals in the integrator role positions, permanent teams (formal groups) provide greater coordination benefits. The prior IS research summarized in Table 1 seems to support Daft's views. The IS empirical study of an integrator role for corporate/division coordination (Iacono et al. 1995) suggests that when central IS managers play these roles, coordination goals can be difficult to achieve and benefits can be difficult to quantify. Given the continued reports of "woefully lacking" business knowledge and skills among IT professionals (e.g., Rockart, Earl and Ross 1996), the theoretical benefits associated with the integrator role mechanism are likely to be attained at a considerable organizational cost.

In contrast, there is a relatively large body of IS research documenting the usage and effectiveness of formal groups for cross-unit collaboration. Two different group mechanisms are likely to be valued. First, an IS steering committee with business division representation is likely to be an important BU:IS mechanism under Centralized IS contexts, because a Centralized hierarchical structure does not foster this type of collaboration. Second, an IS standing team of corporate IS managers and decentralized IS unit heads (typically IS managers with systems development responsibilities who report to line managers under a Federal design) is likely to be an important IS:IS mechanism under Federal IS contexts, because the Federal hierarchical structure does not foster this type of collaboration.

This suggests that formal group mechanisms for corporate/division collaboration are likely to provide better cost/benefit tradeoffs than integrator roles do. The second proposition is therefore as follows:

P2: Organizations with Centralized or Federal IS governance are likely to perceive formal group mechanisms as more effective than integrator roles for building and sustaining a lateral organization capability.

2A: Organizations with Centralized IS governance are likely to perceive a steering committee mechanism (with business management representation) as more effective than an integrator role mechanism for BU:IS coordination.

2B: Organizations with Federal IS governance are likely to perceive an IS standing committee mechanism (with centralized and decentralized IS managers) as more effective than an integrator role mechanism for IS:IS coordination.

A Categorization Scheme of Horizontal Mechanisms Based on Prior Literature

The objective of this section is to develop a theory-based categorization scheme of horizontal mechanisms for corporate/division coordination of the IS function to facilitate the data analysis for this study. Based on a synthesis of the organization theory and IS empirical literature discussed earlier, this scheme includes both formal and informal mechanisms that may be used by CIOs and other top managers to achieve BU:IS and IS:IS coordination.³

First, as discussed above, the IS empirical research in Table 1 provides us with strong evidence for the utilization of a formal group mechanism to achieve cross-unit coordination of IS activities. Two formal group mechanisms are documented: steering committees with business unit representatives, and standing committees that consist of IS managers from both centralized (corporate) IS and decentralized IS units. As argued for Proposition 2, steering committees have been associated with BU:IS coordination, IS standing committees with IS:IS coordination. In **Table 2**, these mechanisms are categorized as type 1a and type 1b, respectively.

Second, an integrator role mechanism is conceptualized by organization theorists as a design tool for establishing a high degree of cross-unit collaboration. When this mechanism is implemented

³ As stated previously, the scope here is corporate/division level, not project level.

in a matrix (two-boss) structure, cross-unit accountability is strengthened. A specific type of full-time integrator in which a central IS manager (without direct IS reports) is responsible for managing one or more internal customer "accounts" has been documented (Iacono et al. 1995). No field studies of integrator role positions that are accountable for achieving both decentralized unit goals and centralized IS goals under Federal governance forms were found. However, this type of integrating manager has been reported on in other IS literature. For example, systems managers who report to a business division and have their own systems development units may be responsible for playing an integrating manager role with corporate IS, often with a two-boss reporting structure (e.g., Brown and Magill 1994, Von Simson 1990). This suggests that cross-unit integrators may be implemented in either Centralized or Federal IS contexts, serving either a BU:IS or IS:IS coordination function. In Table 2 this type of formal role is referred to as a Cross-unit Integrator and is categorized as type 2a.

Another type of formal role mechanism, corporate IS oversight roles, has emerged as IT investment expenditures throughout the enterprise have increased and standardized IT architectures have become more important (Applegate and Elam 1992). For example, formal mechanisms for setting and monitoring IT infrastructure standards, such as corporate review roles for IT acquisition requests, are likely to be found in firms with shared IS resources--i.e., in firms with either Centralized or Federal governance forms. In Table 2, this type of formal role is categorized as type 2b.

Third, recent organization theorists have argued for the importance of informal (non-structural) mechanisms, in addition to formal (structural) mechanisms, as design tools for horizontal strategists (Galbraith 1994, Mohrman 1993, Nadler and Tushman 1992). Three of the network-building design actions for the informal organization described by Galbraith (1994) have been documented in the empirical IS literature and are included in the categorization scheme under the category labeled Informal Networking Practices: physical co-location (type 3a), interdepartmental events (type 3b), and information technology (IT) networks (type 3c). More specifically, Clark (1992) has provided evidence for the frequent utilization of the physical co-location mechanism for BU:IS collaboration, in which systems development personnel are physically co-located with their business clients. The utilization of periodic interdepartmental events (IT conferences and roundtables) and IT networks (e-mail and other groupware) for IS:IS coordination is documented in a case study by DeSanctis and Jackson (1994). The IS literature that calls for IS/business alignment and IT professional reskilling suggests that interdepartmental events and other informal networking opportunities to promote BU:IS networking are also likely to be implemented in today's large organizations (Rockart, Earl and Ross 1996). The recent widespread diffusion of intranets also increases the likelihood of informal BU:IS and IS:IS networking via IT networks.

Fourth, the two human resource practices identified by Galbraith (1994) have been included in the categorization scheme under the category labeled Cross-Unit Human Resource Practices: job rotation (type 4a) and cross-unit input to performance reviews (type 4b). These mechanisms can be used to promote either BU:IS or IS:IS coordination. Although the primary rationale for their inclusion comes from organization theory, support for their potential relevance is found in prior conceptual IS research. For example, cross-functional (IS-line) career pathing and incentive

schemes that reward IS-line partnership relations are discussed by Zmud (1988) as mechanisms to influence managerial behaviors. Both of these HR practices also appear to be useful mechanisms for building a predisposition toward, and a perception of mutual benefits from, cross-unit partnerships as described by Henderson (1990).

The resulting categorization scheme to be utilized for data analysis therefore contains a total of four categories and nine types of mechanisms for corporate/division coordination of the IS function.⁴

METHODOLOGY

A synthesis of the prior organization science and IS literature suggests that there are major gaps in our knowledge about the usage of mechanisms for the IS function. In particular, no prior study has investigated mechanism usage for the IS function using a categorization scheme of formal and informal mechanisms or has investigated mechanism usage under different IS governance contexts. A case research methodology was therefore chosen for this study in order to collect rich descriptive data on mechanism usage. The case research approach also allows the researcher to take advantage of unique case features and opportunities for triangulation (Eisenhardt 1989). Its primary drawback is that the generalizability of the results is limited to propositions for future research, not to a population.

A theoretical sampling method was used to identify two case sites that would allow us to confirm or disconfirm the propositions. Senior managers of IS and non-IS units in two Fortune-500 manufacturing firms—one with a Centralized IS governance context and one with a Federal IS governance context—participated in the data collection.⁵ These two case sites provide an appropriate theoretical sampling for the following three reasons. First, both had well established implementations of the IS governance forms of interest: **Company C** had been evolving toward a more Centralized IS governance form over the past decade, and **Company F** had been evolving toward a Federal form over the same time period. Second, the in-place CIOs at the both case sites were the primary architects of the IS organization designs being studied. Third, the researcher was also assured of access to other senior managers at each site who could share background knowledge about the corporate/division mechanisms from key IS and non-IS stakeholder positions. Both CIOs had been in their positions for a period of several years and, based on the interviews with the other managers, were regarded as proactive vertical and horizontal strategists for the IS function.

Multiple methods were utilized to collect data on the in-place mechanisms as part of a larger study on the alignment of the IS function during 1991-1992. The primary objectives for the larger study were to increase knowledge about factors which influence a change in the hierarchical

⁴ The remaining design action identified by Galbraith (1994), mirror-image organizational structure, was not included in the categorization scheme because it is more typically viewed as a structural design option for the IS organization, rather than a horizontal linking mechanism (e.g., Martin et al. 1994).

⁵ For a similar site selection strategy, see Olson (1981).

structure for the IS organization (Centralized, Decentralized, Federal), as well as how horizontal mechanisms contribute to the successful implementation of this IS governance form; its intended outcome was theory-building. First, on-site, semi-structured interviews were conducted in order to develop a list of specific coordination mechanisms at each case site, as well as qualitative data on mechanism intent and effectiveness. In order to obtain scaled ratings of the relative importance of the full set of mechanisms identified during the interviews, a survey form was then developed for each case site and administered by mail to the same organizational participants. This multi-method approach therefore provided the opportunity to triangulate the interview findings with data collected by mailed survey.

At both case sites, a direct report to the CIO served as the primary contact for the researcher. The primary contact provided relevant historical information about the company and the IS function, assisted with the identification and solicitation of the target participants, scheduled all interviews, and provided feedback for various confirmatory documents (described below). In consultation with the researcher, a sample of IS and non-IS senior managers who provided similar stakeholder viewpoints across the two case sites and were considered knowledgeable about the mechanisms of interest were identified and asked to participate. As can be seen in **Table 3**, the IS participants interviewed at each company included the senior executive of the corporate IS unit (CIO) and directors of corporate and decentralized IS units, as relevant. The non-IS managers interviewed included one V.P. of a corporate function and a minimum of two operating group or division V.P.'s.

Prior to all on-site interviews, each participating executive received a one-page prospectus developed by the researcher that introduced the study and its objectives. Each interview began with a discussion of the current IS reporting arrangements. The data on specific coordination mechanisms were elicited via open-ended questions: the executives were asked to identify in-place mechanisms that were “keys to success” for the company to achieve its IS performance objectives, given its IS governance design (Centralized or Federal). Organization charts and other relevant company documents provided by the participants were also scrutinized. Following the completion of all interviews for each case site, the responses elicited from the open-ended questions were aggregated in order to develop a full list of specific mechanisms at each case site. The mechanisms related to human resource practices—including training/development opportunities, job rotation examples, and practices related to performance reviews—were recorded in a separate listing from the others. The reason for this separate listing was that at the time of the data collection, human resource practices had not been conceptualized as horizontal mechanisms in the organization theory literature known to the researcher.⁶

These two lists of mechanisms provided the content for the follow-up survey. Each mechanism was presented in the survey form using terminology understandable to all participants, with enough details to ensure shared meaning among the IS and non-IS managers who were interviewed. For example, for each formal group mechanism, the company-specific name of the committee or team was listed, along with its membership. The survey form asked for ratings of importance for each mechanism on a 7-point scale, with 7 = Extremely important, 1 = Not at all important, using the “keys to success” wording that had been used in the elicitation of the

⁶ It is not known whether any bias in the responses was introduced by this presentation ordering.

mechanisms during the on-site interviews. The participants were also asked to confirm the completeness of each list of mechanisms by adding any omitted mechanisms and rating them on the scales provided. Each survey form was mailed directly by the researcher to the IS and non-IS managers who were interviewed, and all survey forms were mailed back directly to the researcher. Unfortunately, complete surveys were not received from two of the non-IS managers who were interviewed at Company C.

The initial within-case data analysis was descriptive and was reported back to the participants in the form of a confidential report for each case site. Narrative descriptions of the overall firm, its IS organization history, and the individual mechanisms listed in the survey form were followed by a presentation of the findings on the relative importance of the mechanisms for the successful implementation of the IS governance form. Aggregate findings were reported only, based on the promise of anonymity by the researcher. First, the qualitative findings based on the interviews were presented for each mechanism listed in the survey form, followed by the quantitative findings in graphical form, and then the researcher's interpretation of the results. Each company-specific report was initially previewed by the primary contact and CIO at the case site, and then shared with all of that firm's participants. Feedback on these reports was received from the same company executives.

For the data analysis to evaluate the two propositions for this study, each company-specific mechanism was classified by the researcher according to the categorization scheme in Table 2, and then coded according to the type of lateral organization capability (BU:IS or IS:IS) it was intended to build and sustain, based on the interview data. For example, an advisory board of senior business executives for IS strategy, policy, and resource issues at Company F was classified as category #1 (formal groups), type 1a (steering committees), and coded BU:IS (intended to coordinate across corporate IS and the business divisions). The IT management committee at Company F that was reconstituted to include both corporate and division IS directors was classified as category #1, type 1b (IS standing teams), and coded IS:IS. Galbraith's monograph (1994) was the primary source for classifying the category #3 and category #4 mechanisms. For example, training/development (T/D) events sponsored by various organizational units (corporate IS, corporate HR, or a business division) were identified by the participants as opportunities for building interpersonal networks. BU:IS collaboration was facilitated by T/D events on business topics that brought together business and IS personnel; IS:IS collaboration was facilitated by T/D events that were accessible to both corporate and divisional IS staff. These T/D mechanisms were coded as category #3 (informal networking practices), type 3b (interdepartmental events), rather than as category #4 (cross-unit human resource practices), based on Galbraith's rationale (see Literature Review section above). Mean scores and standard deviations were calculated for each specific mechanism based on the survey responses. Due to the small number of participants at each case site, visual inspection was used for drawing comparisons. A comparison of the approximately equal number of IS and non-IS participants at Company F revealed only one significant disagreement across these two participant groups. Specifically, the CIO's advisory committee of senior business executives (type 1a) at Company F was rated 5 or above on the 7-point scale by all IS respondents, but was

rated 4 or below by all non-IS respondents (s.d. 2.09). This same discrepancy was also identified during the interview phase.⁷

The qualitative interview data are the primary data source for the testing of the propositions. Narrative descriptions for each specific mechanism are provided for reference in **Appendix A**. The testing of Propositions 1A and 1B involves comparing counts of the mechanisms for each case site by intent (BU:IS or IS:IS).⁸ The mean scores for specific mechanisms based on the survey responses are used only as supplementary sources of evidence for proposition testing, and were especially useful when the interview data yielded unexpected findings. For Proposition 2, for example, the survey scores for the relevant category #1 and #2 mechanisms are reported as corroborating evidence for the interview findings.

Confirmation of the company-specific findings was achieved in the following four ways. First, as part of the development of the survey form for each case firm, draft lists of the mechanisms elicited from the interview participants were reviewed by each firm's primary contact and CIO to ensure accuracy of description and shared meaning. Second, the participants were asked to note any omitted mechanisms on the survey form, and no omitted mechanisms were identified by any of the participants. Third, the confidential reports described above were shared with each company's IS and non-IS participants. Fourth, an earlier version of this paper was also reviewed by the primary contact and CIO at each case site.

The above methods for this study were selected in an attempt to satisfy the logical tests of construct validity, reliability, and external validity (Yin 1984). The researcher also attempted to avoid previously identified methodological problems with case-based research (Benbasat et al. 1987). More specifically, the constructs of interest were mechanisms for building a lateral organization capability. Construct validity was achieved by the collection of data from multiple informants, both IS and non-IS, and by the participant review of the researcher's case study reports. Reliability was achieved by the use of the same case study protocol for both case sites. In addition, the use of multiple data collection methods allowed for triangulation across the individual interview findings and aggregate survey findings. Although external validity cannot be claimed with a two-case design, literal replication was achieved because both case sites were predicted to develop a lateral organization capability for the IS function using multiple types of mechanisms. Theoretical replication was achieved because the two case sites were predicted to develop different kinds of lateral organization capabilities due to their Centralized versus Federal IS governance forms.

⁷ Three other mechanisms also had high standard deviations, but these were not due to IS versus non-IS differences of opinion. Two mechanisms were corporate IS oversight roles (type 2b): the review of PC requests at Company C (s.d. 2.00) and the data administration position at Company F (s.d. 1.92). The third mechanism with a high standard deviation was also the mechanism with the lowest mean score: frequent job rotations (type 4a) at Company F (s.d. 1.92).

⁸ This analytic approach is similar to the calculation of a mechanism "complexity score" by Hill et al. (1992).

RESULTS

The overall objective of this study is to enrich our understanding about horizontal mechanism usage for the IS function under different governance contexts as a first step toward theory building and the development of theory-based guidelines for managers. The specific objective of the data analysis is to confirm or disconfirm propositions concerning the similarities and differences of horizontal mechanism usage (P1) and the relative importance of two types of structural mechanisms (P2) under Centralized versus Federal IS governance structures, based on a theoretical sampling. As described above, the case research approach also provides the opportunity to capture data of a longitudinal nature to better understand top management's rationale for selecting a given mechanism.

Due to space considerations, the detailed descriptions of the specific top-down mechanisms at each firm are placed in Appendix A. These descriptions are based on an aggregation of the interview responses, although quoted phrases (or words) are provided in an attempt to communicate the flavor of a specific characteristic or to highlight a particular insight. The sequencing of the mechanism descriptions follows the 4-category scheme in Table 2 that was developed for this study.

During the analysis of the interview data on the lateral organization capability (BU:IS or IS:IS) associated with each mechanism, some individual mechanisms were found to be important for both kinds of capabilities. For example, the cross-unit integrator role positions at the director level for the decentralized IS unit heads at Company F (type 2a) were implemented with the intent to not only ensure a strategic IS/business alignment that had not been possible when these were lower level positions, but also to facilitate greater collaboration with the corporate IS leadership; the IS director positions were only one hierarchical reporting level below the CIO and other business executives. Similarly, all four of the cross-unit human resource practices at Company F (types 4a and 4b) were described as facilitating cross-unit collaboration of both kinds—both BU:IS and IS:IS. For example, cross-functional moves in and out of IS units increased the likelihood that cooperative problem-solving would occur across business and IS boundaries, while cross-functional IS moves in and out of corporate IS increased the likelihood of cooperative problem-solving across corporate IS and division IS unit boundaries.

The results of the analysis of the interview data, utilizing the categorization scheme, are summarized in **Table 4**. As described above, five mechanisms at Company F are recorded in both columns (BU:IS and IS:IS): the elevation of the decentralized IS heads to the director level (type 2a), and four job rotation practices (types 4a, 4b). These mechanisms are counted in both the BU:IS and IS:IS totals for Company F, but are *not* double-counted in the overall totals for Company F.

The qualitative findings reported in the text below, Appendix A, and Table 4 are the primary source of data for the testing of the propositions. The quantitative survey data are used as corroborating evidence. The mean scores and standard deviations for each of the specific mechanisms categorized in Table 4 are presented in order from highest to lowest mean score in **Appendix B** for Company C and in **Appendix C** for Company F. Shading is used to graphically

distinguish mechanisms directed at an IS:IS lateral capability (versus BU:IS) using the coding(s) reported in Table 4.

Before discussing the findings for the two propositions, the organizational context and the CIO's overall thrust in horizontal mechanism usage are described below, followed by some selected highlights from the mechanism findings.

Context: Company C

Company C was a Fortune 500 diversified manufacturing firm pursuing a corporate strategy of related diversification with greater than 10,000 total employees and three major operating groups. Its largest businesses were clustered in two different regions of the country. The firm had a history of centralized decision-making emanating from headquarters; corporate reviews of the major business units were held regularly.

The CIO was a corporate officer at the V.P. level, reporting to a Senior V.P. of Administration, and had a decade-long tenure in this position. Other senior managers in the firm regarded him to be an effective architect of the current IS organization, which had approximately 200 employees excluding contractors. The highly Centralized IS governance form at Company C was perceived to match well Company C's enterprise-wide emphasis on efficiencies and standard operating procedures. Whereas at the beginning of the CIO's tenure there were two "competing" and geographically separate IS groups with decision-making authority and severe IS personnel turnover problems, a single, highly Centralized IS organization with a very stable IS workforce had been in place for several years prior to the data collection.

Five IS directors, a controller, and two IS managers reported to the CIO.⁹ Telecommunications & network planning and operations were totally centralized. Data center operations were highly centralized, although decision-making for some distributed platforms resided in the business units. Three other IS directors had systems development responsibilities, one for each of Company C's operating groups; each systems director had a reporting relationship to the CIO only. One of these three directors also had systems development responsibilities for corporate units, and was located at headquarters; the other two systems directors were physically located at their divisions, along with their systems development staffs. No systems development backlog currently existed, because contract personnel were regularly hired to increase the IS workforce as needed.

According to the CIO, horizontal mechanisms had been implemented at Company C to help create an IS organization that seemed "homogeneous" from the inside, yet "customer-driven" from the outside. In addition to the integrator role mechanisms played by the systems directors that had been in place for a few years, several non-structural mechanisms had also been implemented specifically to increase the responsiveness of corporate IS to the systems needs of the divisions. The most recent BU:IS mechanism was a business client survey that was to be used

⁹ Several corporate functions, including some IS functions, were decentralized to the management of a three-year-old joint venture just prior to the data collection. This IS unit did not appear on the IS organization chart, and was viewed by the CIO as a "temporary aberration." Mechanisms to collaborate across corporate IS and the new IS unit of the joint-venture are outside the scope of this study.

as input to performance reviews of IS personnel. Corporate IS personnel were also strongly encouraged to take advantage of internal training courses on business topics that were regularly offered on-site. Two examples of recent cross-unit (BU:IS) moves were also identified as potential top-down mechanisms to improve corporate IS-business collaboration in the future.

Context: Company F

Company F is a Fortune 500 manufacturing firm of greater than 10,000 total employees with a single primary business in a highly regulated industry. The firm's activities were structured by function, and large divisions for R&D, manufacturing, and marketing were managed by general managers who for the most part were located in the same metropolitan area as corporate headquarters. Under the current CEO, there had been a growing emphasis on division autonomy. The CIO held the title of Executive Director and reported to an Executive V.P. A relatively pure Federal governance form for the IS function was in place at the time of the data collection for the more than one thousand IS employees who were based in the U.S. This Federal design was a result of events spanning more than a decade, and was perceived to be well aligned with the company's increased emphasis on division autonomy. Two IS units reporting to R&D management had had responsibility for systems development decisions for two decades and also independently operated some specialized computer platforms. Systems development units reporting to the IS manager level had also been decentralized to the other large divisions five to six years earlier. During the past two years, formerly centralized systems maintenance activities had also been moved to these decentralized IS units, and systems development and maintenance responsibilities had been decentralized to two corporate departments as well (finance, human resources).

Five U.S.-based IS directors with infrastructure responsibilities (data center, telecommunications/networking, technology planning) and systems development responsibilities for cross-division applications were solid-line reports to the CIO. Six other IS directors with systems development responsibilities were solid-line reports to their division managers.¹⁰ As the extent of decentralized IS activities increased over the past two years, several new mechanisms had been initiated by corporate IS in an attempt to build better "partnerships" across corporate IS units and the decentralized IS units. The first of these new mechanisms was the elevation of all decentralized IS heads to the director level; this resulted in a doubling of the total number of IS directors in the corporation. In conjunction with this initiative, a matrix reporting relationship--solid line still to the business unit, but a new dotted line to the CIO—was established for the decentralized IS unit heads in order to increase their accountability to corporate IS. The CIO had also reconstituted two IS standing teams. In the past the CIO had met weekly with his direct reports, but now the decentralized IS heads at the director level (dotted-line reports) were also included in the CIO's weekly staff meetings. All directors also belonged to a second IS standing team that met bi-weekly with HR personnel to discuss corporate and divisional IS job moves at a certain level. The CIO reported that management buy-in to these new mechanism designs involving the decentralized IS unit heads had been achieved via his advisory committee of senior business executives.

¹⁰ A twelfth IS director had European systems responsibilities, but mechanisms designed for coordinating units across national boundaries were outside the scope of this study.

The cross-unit partnering objectives of the corporate IS leadership appeared to align well with the culture at Company F: “people development” was one of the firm’s core values. Cross-functional moves had been formally encouraged by the corporate HR department for several years as a way of nurturing employees of high potential. However, a related corporate HR practice that had previously been highly valued by the participants--internal moves every 18 to 24 months for high performers--was beginning to cause concerns among some of the IS and non-IS managers: divisions didn’t want to “lose” IS personnel in which they had made significant training and development investments.

Findings for Proposition 1

Proposition 1 predicts that both firms are likely to have multiple types of formal and informal mechanisms. Proposition 1A predicts that Company C has multiple types of in-place mechanisms to build and sustain a BU:IS lateral organization capability, while Proposition 1B predicts that Company F has multiple types of mechanisms to build and sustain an IS:IS capability.

The findings for Proposition 1 based on the interview data are summarized in Table 4. Overall, the interview data provide support. As can be seen from the summary totals at the bottom of Table 4, specific mechanisms of all four categories and eight or nine types were identified at both companies. At Company C, the majority (13) of the 23 mechanisms were directed at building and sustaining a BU:IS lateral organization capability. There was also a significant investment in formal roles (category #2) to achieve BU:IS collaboration. These involved both the integrator roles played by the system directors and several oversight roles for IT infrastructure investments under the purview of business management. The non-structural mechanisms emphasized in the interviews were also BU:IS mechanisms, including the co-location of the IS directors and their systems development units (type 3a) and the newly implemented customer survey (type 4b).

At Company F, the majority (14) of the 17 specific mechanisms were implemented to build and sustain an IS:IS lateral organization capability. As suggested by organization theorists, the increased decentralization of systems development responsibilities to the business units over a period of several years had indeed created barriers to coordination across corporate IS and the decentralized IS units. Initially, IS:IS collaboration via interpersonal networks had been heavily relied on; cross-unit interpersonal relationships were strong because of the firm’s multi-year history of aggressive, cross-unit job rotation practices (type 4a). However, the strength of these informal linkages began to erode over time as the decentralized IS units grew in size and responsibilities. During the on-site interview, the CIO was clearly pleased about business management buy-in to several recent structural overlay initiatives: the elevation of all decentralized IS unit heads to the director level (type 2a), their new matrix reporting structure (type 2a), and the inclusion of these directors in his weekly staff meetings (type 1b).

A striped-line relationship to the CIO for the decentralized IS unit heads was in fact used in the internal IS organization chart, rather than the official dotted line. This sent a clear signal about the importance attributed to this dual reporting relationship by the IS leadership. The directors in these integrating positions who were interviewed made reference to their “dual allegiance” roles

and reported serving on task forces with solid-line IS directors as part of their new IS standing committee responsibilities.

Nevertheless, the interview data in Table 4 also suggest that Proposition 1 is *insufficient*: both companies also had implemented three or four categories of mechanisms that were directed at the second kind of lateral organization capability. That is, both Companies C and F had not only implemented mechanisms to diminish the barriers to collaboration due to their IS governance structure, as predicted by Proposition 1, but also had in-place mechanisms to supplement the communication channels established by their current IS reporting arrangements.

More specifically, Company C's participants identified ten mechanisms in three categories that had been implemented to improve IS:IS coordination across corporate IS personnel located in or near headquarters and those located in *geographically dispersed* IS units under two of the systems directors. In other words, even though all systems development units reported to corporate IS directors, the geographical dispersion of these units and their directors created a barrier to collaboration with the remainder of the corporate IS leadership. These IS:IS mechanisms included tri-annual IS operating reviews held at the geographically dispersed sites (type 1b), training/development events that brought together corporate and division IS personnel (type 3b), and new HR practices for IS personnel (category #4) that had been instituted across the geographical clusters and included a common job posting system and corporate-wide performance reviews and recognition awards.

Company F's unexpected investments in mechanisms to coordinate activities across corporate IS and the business divisions (BU:IS) included eight mechanisms in a total of four categories. However, as described above, five of these mechanisms (types 2a, 4a and 4b) actually contributed to both kinds of lateral organization capabilities. Of the remaining mechanisms, the biggest surprise was that an advisory committee of senior business executives that met periodically with the CIO (type 1a) was still viewed by the IS participants as a highly effective BU:IS mechanism. The CIO's advisory committee had been established prior to the strengthening of the integrator role mechanisms for the decentralized IS heads, and in the past it had been a primary communication mechanism with the corporate IS leadership. However, the senior business managers who were interviewed emphasized the utility of this mechanism in the past, rather than its current effectiveness. This was because the heads of the decentralized IS units were now formally responsible for integrating activities with the corporate IS leadership. The impact of the decentralized IS positions on the relevance of the CIO's advisory committee had not yet been fully recognized by the CIO and the IS directors at the time of the interviews. The survey data (see Appendix B and C) provide corroborating evidence for the interview findings for Proposition 1. First, only one mechanism received a mean score below the mid-point (4.0) on the 7-point scale: the HR encouragement of frequent job rotations at Company F.¹¹ The quantitative data therefore provide supporting evidence for the unexpected finding that mechanisms for both kinds of lateral capabilities were valued at each case site. Second, the

¹¹ The 3.8 mean score and high standard deviation (1.92) for this mechanism reflects the concerns expressed during the interview phase by some IS and non-IS managers about "losing their" IS personnel to another division or corporate IS; typical moves for high potential employees were reported to be less than two years.

prediction that Company C would focus on mechanisms directed at building a BU:IS lateral capability (P1A) and that Company F would focus on mechanisms directed at an IS:IS lateral capability (P1B) is supported by the highest mean scores at each case site. Third, the survey data support the interview finding that non-structural mechanisms helped reduce the coordination barriers due to the in-place IS governance structure. That is, two physical co-location mechanisms directed at improving BU:IS coordination (type 3a) were among the three highest rated mechanisms for Company C, and two HR practices (type 4a) were among the eight highest rated mechanisms at Company F.

Findings for Proposition 2

Proposition 2 predicts that organizations are likely to perceive formal group mechanisms as more effective than cross-unit integrators for building and sustaining a lateral organization capability. Proposition 2A predicts that the participants at Company C will perceive a steering committee of senior executives (type 1a) to be more effective than the cross-unit integrator role positions of the systems directors (type 2a). Proposition 2B predicts that the participants at Company F will perceive its two IS standing teams of corporate and decentralized IS heads (type 1b) to be more effective than the director-level integrator role positions that now have a dotted-line report to the CIO (type 2a).

Looking first at Proposition 2A, the CIO at Company C reported that an advisory committee of top managers at the corporate level was not an appropriate mechanism at Company C due to his position as corporate officer; that is, his participation on the company's top management team obviated the need for a separate steering committee at this level. On the other hand, steering committees for IS project prioritization and budgeting decisions had been implemented at the division level. However, these division-level steering committees (type 1a) had not been implemented enterprise-wide: the division-level steering committee mechanism was considered to be an effective design tool for corporate/division coordination only when it matched the "management style" of the division.

In contrast, the integrator role positions played by the systems directors at Company C (type 1b) were characterized as highly valued mechanisms for all major divisions. Except for the systems director who also had corporate application responsibilities, the integrating managers were also co-located in the business units they supported, along with their systems development employees. This combination of integrator role and co-location mechanisms (types 1b and 3a) was viewed as critical to the success of the company's Centralized IS governance structure. These mechanism solutions also were perceived as in alignment with the cost efficiency goals of Company C.

The mean scores in Appendix B quantify the relative importance of the mechanisms in Proposition 2A. The division-level steering committee mechanism (type 1a) was rated quite high (6.0). However, the integrator role (type 2a) mechanism was rated even higher in importance (6.3); the same rating was also given to the co-location mechanism for these integrators (6.3) and the highest score (6.8) was given to the co-location mechanism for the systems development units that reported to the systems directors. Although the sample size and makeup preclude a test for significant differences, the survey findings do corroborate the interview findings: Proposition 2A is not supported.

Turning next to Proposition 2B, Company F had two IS standing teams (type 1b) in place: a standing committee of the solid-line corporate IS and dotted-line (decentralized IS director) reports to the CIO that met weekly, and a systems personnel committee of all IS directors that met biweekly to consider enterprise-wide IS personnel issues. Both of these committees had been purposefully reconstituted by the CIO to include the decentralized IS heads at the director level in order to increase corporate/division coordination. Despite the time commitment required for these weekly meetings, both standing committees were viewed as highly effective mechanisms for reducing the communication barriers created by the Federal design for the IS organization. On the other hand, the reconstitution of these formal IS standing committees was dependent on two design actions related to the integrator role mechanisms (type 2a): the "elevation" of the decentralized IS heads to the director level as well as the implementation of the matrix reporting relationship to the CIO. The interview data therefore suggest that it was the combination of these two types of structural overlays—integrator roles and formal groups—that was critical to the success of the company's Federal governance structure.

The mean scores in Appendix C quantify the relative importance of the mechanisms in Proposition 2B. Both IS standing teams (type 1b) had the same high mean score (5.8), but the scores for the establishment of the director-level integrator role positions (6.2) and their new dotted-line report to the CIO (6.1) were even higher. Although the differences in these mean scores are small, the survey findings again corroborate the interview findings: Proposition 2B is not supported.

DISCUSSION

Given the potential importance of horizontal mechanisms for facilitating collaboration across organizational boundaries, the objective of this study was to increase our cumulative knowledge about the utilization of these design tools under two different IS governance forms: Centralized and Federal. As a first step, preliminary propositions were formulated based on a synthesis of prior organization theory and IS research. Prior literature was also used to develop a classification scheme in order to analyze the qualitative and quantitative data collected from two case sites with theoretically different IS coordination needs.

Support was found for Proposition 1. As predicted, the IS executives at Companies C and F had proactively implemented multiple types of formal (structural) and informal (non-structural) mechanisms to build lateral organization capabilities for the IS function. Support was also found for Propositions 1A and 1B. Mechanisms of all four categories in the classification scheme were used to build a BU:IS lateral organization capability at a firm with Centralized IS governance (Company C) and an IS:IS lateral organization capability at a firm with Federal IS governance (Company F). The highest valued mechanisms at the two companies were also of the kind predicted: BU:IS mechanisms at Company C, IS:IS mechanisms at Company F.

The qualitative and quantitative data collected for this study therefore provide empirical support for the theoretical assumption that coordination mechanisms are used to help eliminate or reduce

the communication barriers ("dysfunctional effects") of in-place hierarchical structures in order to achieve objectives that require cross-unit collaboration. At Company C, non-structural mechanisms were used to create a more "customer responsive" IS organization that matched well the company's overall cost-efficiency goals. At Company F formal structural overlays were implemented to increase collaboration across IS managers in corporate and decentralized IS units within a company that placed a high value on division autonomy, but also had economies of scale and connectivity objectives for its global infrastructure.

However, Proposition 1 was also found to be *insufficient*. Company C and Company F not only had in-place formal and informal mechanisms for the predicted kind of lateral organization capability (BU:IS and IS:IS, respectively), but also had invested in mechanisms for the second kind of lateral capability. In particular, Company C had in-place mechanisms to supplement its hierarchical reporting arrangements because of the coordination difficulties associated with its geographically dispersed (but not decentralized) IS units. In other words, the co-location and integrator role mechanisms that were used to increase BU:IS coordination needed to be balanced with additional IS:IS mechanisms. At Company F, the mechanisms for BU:IS coordination that supplemented the Federal reporting relationships were for the most part mechanisms that predated several recent IS:IS mechanism initiatives. In fact, the relative importance of two of these mechanisms had only recently begun to diminish: the CIO's advisory committee and the corporate HR practice of frequent job rotations. In other words, the strengthened Federal governance structure and integrator roles were just beginning to impact the importance of pre-existing mechanisms.

Proposition 2 was not supported. The specific formal group mechanisms of interest had in fact been implemented at the two case sites (steering committee at Company C, IS standing teams at Company F) and were considered to be important by the participants at each case site. However, the participants at both firms also highly valued their respective in-place integrator role mechanisms. At Company F, the integrator role mechanisms were valued even more highly than the two IS standing team mechanisms. At Company C, the integrator role mechanism implemented enterprise-wide was valued more highly than the division-level steering committee mechanism.

In addition, the *contingent* effectiveness associated with the steering committee mechanism for BU:IS coordination (type 1a) should be highlighted. At Company C, a steering committee at the corporate level was viewed by the CIO as unnecessary; instead, collaboration was achieved by virtue of the CIO's participation on the company's top management team. At Company F, the advisory committee for the CIO received a much lower aggregate rating (5.1) than the formal group mechanism directed at IS:IS coordination (type 1b). This suggests that the potential effectiveness of the steering committee mechanism that has been reported in prior IS research is highly contingent on organizational context. For example, when the IS organization has a Federal structure and an integrating role mechanism is in place, this type of formal group mechanism becomes a redundant mechanism for linking business management with corporate IS (BU:IS). As seen at Company F, the IS standing team mechanism directed at increasing IS:IS collaboration became the more important formal group mechanism under a Federal structure;

these IS standing teams established a new channel for corporate/division collaboration, whereas the CIO's pre-existing steering committee became a redundant mechanism.¹²

Before discussing the implications for these findings, several limitations need to be recognized. First, the propositions for this study focused on top-down mechanisms and the findings are only intended to be applicable to large firms with some sort of division structure. Second, as stated in the Methodology section, the two-site theoretical sampling method used for this study does not permit generalization to the population of large firms with Centralized or Federal IS decision-making contexts; instead, these findings are limited to the development of insights for empirically-grounded propositions for future research. Third, no objective performance measures were captured. Instead, only perceptual measures of effectiveness were captured and reported in aggregate form. Fourth, the sample size and coding schemes did not allow for rigorous statistical tests of the quantitative survey data; only visual inspection was used for the comparative analysis of quantitative data in support of the qualitative findings. Fifth, while a preference for face-to-face communications clearly existed in both firms, the middle-range ratings for the IT network mechanism (type 3c) at both case sites also reflects the time period of data collection--i.e., the data for this study were collected prior to the recent explosive growth of groupware tools and new electronic communication channels via the internet and intranets. Sixth, the likelihood that context characteristics other than the firm's IS governance form may influence top-down mechanism preferences was not systematically studied.

Implications for Research

Several important implications for future research can be gleaned from this study. First, the support for Proposition 1 alone suggests that the IS empirical research to date has only scratched the surface in terms of understanding mechanism usage for corporate/division coordination, let alone differences in usage under different IS governance contexts. Evidence for the importance of examining an organization's full suite of mechanisms is also provided here: CIOs in both Centralized and Federal IS governance contexts are likely to implement multiple types of formal and informal mechanisms to remove coordination barriers created by the reporting arrangements for the IS organization. In addition, CIOs are likely to implement horizontal mechanisms to supplement communication channels created by the hierarchical reporting arrangements for the IS function, especially in contexts where IS governance is Centralized, but systems development units are geographically dispersed. A more holistic approach to research on horizontal mechanisms for the IS function, such as adopted for this study, is therefore clearly warranted. However, there is also a need for investigations that focus on the specific design options for an individual mechanism under differing IS contexts as well as specific coordination goals for an individual mechanism. A recent survey of CIOs in primarily Fortune 500 companies with four different types of IS governance structures (Brown and Sambamurthy 1998) provides some initial empirical evidence on these issues.

¹² As reported in the Methodology section, this was the only mechanism for which the IS and non-IS participants at Company F provided significantly different ratings of importance: the IS participants valued this mechanism much more highly than the non-IS participants. Whether or not the widespread attention that the steering committee mechanism has received in the trade literature was a contributing factor to the lagging recognition of the diminished importance of this advisory committee mechanism on the part of the IS participants is not known.

Second, organization theorists have argued that the organizational architect will select mechanisms based on their cost/benefit tradeoffs. Using the mechanism labels from the categorization scheme developed for this study, for example, informal networking practices would be expected to have the lowest implementation costs and integrator roles the highest. The finding by DeSanctis and Jackson (1994) that large organizations with Federal designs are likely to invest in more costly formal mechanisms for corporate/division coordination across decentralized IS units¹³ and the findings of this study provide some support for this theoretical viewpoint. Companies with Federal IS contexts pursue IS goals that require corporate/division collaboration, and formal structural mechanisms are needed to remove the barriers to IS collaboration created by these Federal structures.

However, this study also suggests that the evaluation of cost/benefit tradeoffs for *single* mechanisms may be too simplistic a view. At Company F the implementation of cross-unit IS standing teams was dependent on the establishment of other structural mechanisms: director-level integrator role positions with a dotted-line report to the CIO. At Company C the effectiveness of the integrator role positions was dependent on the physical co-location of these systems directors and their systems development units. Company C, however, also then implemented structural and non-structural mechanisms to ensure IS:IS coordination between corporate IS management based at headquarters and the IS personnel at dispersed locations. As suggested by Daft (1992), then, the mechanism choices yielding the greatest benefits may be those that take into account combination effects. Assessing the tradeoffs created by *multiple* mechanisms thus appears to be a more relevant cost/benefit approach.

The notion of a strong “informal organization” as a requisite “foundation” for more costly structural overlays (Galbraith 1994) may also be worthy of more attention by IS researchers. Company F provides an example of how enterprise-wide HR practices created a work environment conducive to collaboration. Similarly, the co-location of systems directors at Company C facilitated the participation of IS directors in business management meetings without implementing a more costly dual reporting design. The recent survey findings by Brown and Sambamurthy (1998) support these views; these authors have proposed an “iceberg” metaphor to signal the importance of “below-the-waterline” informal mechanisms.

Management researchers have also suggested that organizational preferences for specific mechanisms, and matrix forms, reflect the degree of “trust” between different organizational units (e.g., Creed and Miles 1992). Similar to Galbraith’s notion, then, informal approaches may need to be implemented *before* more costly formal mechanisms in order to first build “trust” across corporate/division boundaries. This suggests that studies that take a more holistic approach, as well as research designs that capture longitudinal data, are needed to better understand the potential relationships between formal and informal mechanisms.

¹³ The prior research finding by DeSanctis and Jackson (1994) that groupware improves the effectiveness of a formal IS committee mechanism for coordination across decentralized IS units is neither strongly supported nor contradicted here. Several formal mechanisms that relied on face-to-face communication were considered to be successfully implemented for IS:IS coordination at Company F, but the only IT-based mechanism was a simple E-mail mechanism.

Another implication for future research is that research designs that capture context factors other than IS governance are clearly needed, as also called for by other IS researchers (DeSanctis and Jackson 1994, Saaksjarvi 1994). Of particular importance here are those factors that may influence a company's interest in achieving synergies across organizational units (Galbraith 1994). For example, Company F was in a single primary business that had implemented highly autonomous functional divisions; these divisions by definition had high interdependencies, and the firm had for many years emphasized people development via cross-unit job moves. In contrast, the CIO at Company C reported a corporate emphasis on operating efficiencies and a satisfaction with less costly mechanisms for corporate IS coordination with business units. In addition to these structural and cultural context factors, IS-related context factors that have been associated with IS governance decisions, such as the strategic role of the IS function and level of IT management knowledge on the part of senior business managers (Brown and Magill 1998), may also be important for predicting top-down mechanism preferences. Brown and Sambamurthy (1998) also point to the importance of capturing changes in business imperatives and the organizational legitimacy of specific mechanisms outside of the IS function.

Implications for Practice

This study contributes to practice in three important ways. First, it provides evidence that today's IS managers need to be effective horizontal, as well as vertical, strategists. In particular, companies with Centralized or Federal IS structures need to implement horizontal mechanism in order to break down the barriers to cross-unit collaboration created by these hierarchical structures. Second, the theory-based categorization scheme developed for this study and used to compare the mechanism implementations at the two case sites (Tables 2 and 4) can be utilized by CIOs and other top managers as a framework to assess the lateral organization capabilities of their own organizations—both for corporate IS-business coordination and for corporate-division IS coordination.

Third, the data on horizontal mechanisms collected at the two case sites selected for this study are not only theoretically useful, but also practically useful. In particular:

Company C provides an example of how an organization with highly Centralized IS governance can use low-cost informal mechanisms, in combination with integrator role positions for systems development directors, to become more "customer-driven."

Company F provides an example of how an organization with Federal IS governance can strengthen corporate/division partnering by establishing a dual reporting relationship for decentralized IS unit heads and reconstituting IS standing teams to include both corporate and decentralized IS unit heads.

In addition, we found that companies with geographically dispersed IS units are likely to implement additional mechanisms to ensure effective collaboration across these distributed units. Fourth, this study highlights the notion that an effective lateral organization capability is developed over time. Both CIOs in the case sites selected for this study had been proactive horizontal strategists over a period of several years and exploited one of the strengths of horizontal mechanisms as design mechanisms: they can be implemented piecemeal, without the

organizational disruption that is associated with changes in governance forms. However, our study also uncovered the need for CIOs to regularly assess the adequacy of in-place top-down mechanisms, as well as the top-down mechanism potential of emergent practices, with input from both IS and non-IS managers. At Company F, an erosion of the perceived effectiveness of an HR practice (frequency of job rotations) and a long-standing advisory committee for the CIO had not yet been fully recognized by the firm's IS executives. Similarly, this study uncovered two recent instances of job rotation practices that improved corporate IS-business collaboration at Company C and were more highly valued than several long-standing interdepartmental events or corporate IS oversight roles, but had not yet been widely promoted by the CIO.

Conclusion

This study has attempted to expand our rather limited knowledge of mechanism usage for corporate/division coordination of the IS function under Centralized and Federal IS governance forms. The findings provide evidence that today's CIOs are indeed implementing multiple formal and informal mechanisms in order to facilitate cross-unit collaboration, as advocated by organization theorists. Specific mechanisms were classified using a categorization scheme developed for this study in order to identify differences in mechanism usage under Centralized and Federal IS governance contexts. The more holistic approach taken for this study also proved to be useful for developing some initial insights about cost/benefit tradeoffs and combination effects that deserve further investigation.

If the dual pressures for responsiveness to division needs and the attainment of enterprise-wide synergies continue to increase as anticipated, expertise in the design of lateral organization capabilities is likely to become a critical IS management competency. This study suggests that the implementation of horizontal mechanisms for two kinds of capabilities--corporate IS collaboration with business units as well as collaboration across decentralized or geographically dispersed IS units—deserves more attention from both academic and practitioner members of the IS community.

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Appendix A: Descriptions of Specific Horizontal Mechanisms

COMPANY C

Category #1: Formal Groups

An IS *steering committee* mechanism had been implemented at the operating group level. This committee of business unit managers approved systems projects and determined project prioritization for the respective divisions. Several managers suggested that this committee set up a structure for "steering" which matched the "management style" of these businesses.

No *steering committee* existed at the corporate level. In fact, it was pointed out by the CIO that the company "doesn't run that way" at the top management level. The CIO's position as an officer of the company ensured regular face-to-face decision-making opportunities with C's top management.

IS standing committees were also utilized to achieve coordination across the corporate IS directors at headquarters and geographically dispersed divisions. Quarterly meetings were held with the CIO and all IS directors at which each director reports on "what's happening." The corporate IS organization also held thrice annual operating reviews for the operating groups in which the CIO and all IS directors (and the group-specific IS managers and supervisors) had face-to-face communication. A multi-day strategic planning session with the CIO and the IS directors was also held annually, and all members of the IS management team--including the dispersed directors--participated on task forces in preparation for this annual meeting. Each IS director served as a moderator for the joint discussion of at least one strategic area.

Category #2: Formal Roles

The three corporate IS directors with systems development responsibilities had *integrator role* responsibilities. In keeping with Company C's preference for centralized decision-making, no "dotted line" relationship with the operating group heads existed, and the IS and non-IS participants did not perceive such a mechanism to be needed. However, all three of these systems directors were regularly included in meetings of their respective business unit's management; that is, they were said to act as if there were a dotted-line reporting relationship. Several corporate *IS oversight roles* were also in place to coordinate IT purchasing and leasing contracts. Corporate IS executives had review authority for all IT acquisitions from external sources, including mini-computer purchases for plants and PC purchases by business units. Corporate IS had developed "white papers" with standards for PC hardware and software and LANs, and also played a role in IT equipment lease contracts for the divisions.

Category #3: Informal Networking Practices

Each of the three directors with systems development responsibilities was *physically co-located* near the top management of the operating company they supported: the director who had corporate systems in addition to operating group responsibilities was located at headquarters, while the other two directors were geographically dispersed. The objective was to "blend in with the customer organization" to the extent that the director would actually feel like "one of them"--and there would be a "comfortable exchange." Each systems development team was also

physically located near the IS director they reported to, and therefore also co-located with the management of the major operating group they supported. The co-located IS personnel were reported to have "day-to-day" opportunities for "learning the business" due to this mechanism. Several periodic *interdepartmental events* facilitated information sharing across business and IS management, as well as across corporate and dispersed IS personnel. Information technology demonstrations were periodically provided for the top management group. IS personnel were strongly encouraged to take courses on topics related to the business. Technology training/development opportunities, as well as technology conferences on an "as needed basis," were sponsored by corporate IS. Director-level IS personnel also had regular opportunities to participate in the same offsite seminars.

An *IT network* that linked all IS managers, but not all division managers, provided E-mail services. However, at the time of data collection, its usage for internal communication was not as large as expected in the near future.

Category #4: Cross-Unit Human Resource Practices

A temporary *job rotation* assignment in a business unit had recently led to a permanent non-IS career move to a financial analyst position for a well-regarded corporate IS employee. This cross-functional move was touted as highly desirable. For example, the CIO offered he would "like to do more IS/non-IS moves," and a division executive suggested it "may be a wave of the future." Although staff development in general was referred to as a "critical success factor" for corporate IS, no current initiatives specifically targeted business/IS moves. All internal IS positions, however, were published on a corporate IS job listing to "actively encourage" moves. Several recent initiatives had increased cross-unit *input to performance* reviews. An annual customer survey had been initiated just prior to the data collection; this survey was viewed by IS management as an important business input to IS performance assessments. "Totem" rankings of IS personnel were established by "majority vote" of the IS directors in order to assist in the career planning process. New, corporate-wide IS performance awards (with financial incentives separate from merit increases) had also recently been implemented; sixteen awards had been given by the CIO the preceding year to promote "people retention."

COMPANY F

Category #1: Formal Groups

An executive advisory board for IS strategy, policy, and resource issues had been in place for some years. Under the current CIO, this *steering committee* had been reconstituted in membership and mission. It was chaired by the CIO's boss and the members included operating group V.P.'s, the CFO, and other key V.P.'s. According to the CIO, its mission included "developing strategy." The general manager buy-in to the "value" of the IS function as well as to the need for director-level positions for the decentralized IS units (see type #2 below) had also been largely accomplished via this committee. One general manager reported but that, in the past, it had been an effective communication mechanism to "link across" the organization. Since the decentralization of systems development groups, the information he received from these periodic meetings had helped him "to guide the IS people" he was responsible for. However, the

non-IS managers also reported that the advisory committee “doesn’t vote much.” One of the IS managers also reported that attendance at the committee meetings had dropped off.

Two formal *IS standing committees* also ensured a significant amount of "face time" every week between corporate and decentralized IS unit heads in formal IS committee meetings; according to one corporate IS director, "they're dispersed, but not autonomous." First, the decentralized IS directors were expected to participate in corporate IS staff meetings with the CIO and his direct reports once a week. This was a visible change in membership on this standing committee to accommodate the recently elevated IS directors. (Task forces with corporate and decentralized IS director representation were also commonly utilized by the CIO to study agenda items for these staff meetings.) Second, a systems personnel committee of all corporate and dual-reporting IS directors met bi-weekly with HR personnel in order to do personnel planning and reach consensus on human resource decisions for IS managers, including job moves for corporate and division IS personnel. The current CIO had increased the frequency of committee meetings, as well as the range of issues discussed. The significant amount of in-person interaction time was feasible because of the close geographical proximity of all U.S.-based IS units.

Category #2: Formal Roles

A recently completed initiative of the current CIO was the redesign of the decentralized IS unit head positions into dual reporting *integrator roles* at a higher organizational reporting level. A primary motivator was to "create a partnership inside" the business unit in order for IT to achieve the "level of attention and understanding" needed to be a strategic enabler. This was accomplished in two ways: i) elevation of these positions to the director level, and ii) the formal implementation of a dotted-line reporting relationship to the CIO.

The elevation to director level was accomplished over a period of three years as individual divisions accepted new systems development or maintenance responsibilities by "mutual agreement."¹⁴ By the time of the data collection, the decentralized IS unit heads at the director level had become "more privy" to "what's really going on" in their business unit--rather than "learning third hand." They were considered a part of the management team of their division, which put them "in a position to understand the issues and re-prioritize applications," and led to "cohesive partnerships." There was now a "strategic thrust" for all but one decentralized IS unit. The corporate IS directors and CIO also anticipated that this change would help to eliminate the "difference in expectations" between IS and business units: "customer expectations" were higher than IS, it was felt, because IS managers "know more about IT." That is, under decentralization, "users realize that jobs are bigger than they seemed."

Company F's organization charts reflected the matrix design of these integrator roles: a solid-line report to the business unit, dotted-line to the CIO. The new IS directors in the divisions were actually viewed as having a striped-line (or "close" dotted-line) reporting relationship to the CIO,

¹⁴ When systems maintenance responsibilities were accepted by decentralized IS units that previously only did new development, the IS managers of these units were elevated to the director level. When systems development (and maintenance) responsibilities were newly decentralized to the corporate finance and human resource departments, the heads of these new IS units were also positioned at the director level. In total, this resulted in six new IS director positions within the divisions.

and were expected to have "two allegiances." One decentralized IS director who had recently been promoted from a business management position referred to operating under two bosses--with 60% "loyalty" to the business unit, and 40% to corporate IS.

In order to help coordinate activities between corporate IS and the divisional IS units, several *corporate IS oversight roles* had also recently been implemented. New corporate positions with responsibilities for global IS planning and centrally coordinated data administration had been implemented. Corporate IS had also taken a more active role in standard-setting for the acquisition of IT products and services purchased by IS units in the divisions: although there was a "reasonable amount of connectivity" in place, corporate IS wasn't "waiting" for new technology requests to promote integration. Centrally coordinated standards and training in "consensed" systems development methodologies and CASE tools had also recently been put in place.

Category #3: Informal Networking Practices

One of Company F's published "core values" was the nurturing of its human resources, and training & development *interdepartmental events* were regularly offered by the HR department, the divisions, and corporate IS. Corporate IS offered technology training & development for both corporate and decentralized IS professionals.

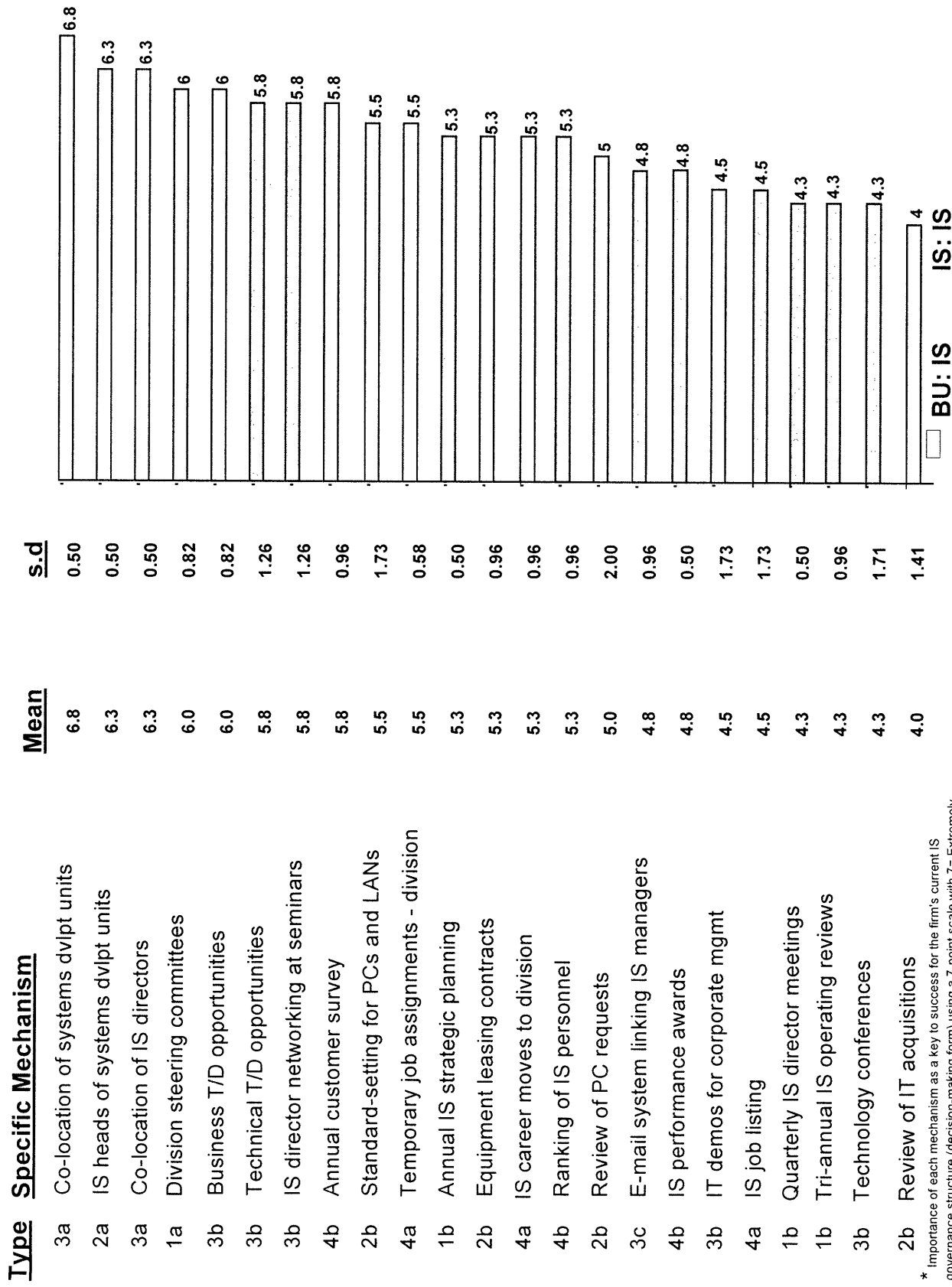
The corporate and division IS managers were connected via an *IT network* with mainframe E-mail services. Increased globalization was a corporate initiative, but global connectivity at the workstation level had not yet been realized.

Category #4: Cross-Unit Human Resource Practices

Several corporate HR practices regarding *job rotations* were in place, resulting in frequent movement between IS and non-IS assignments, and between corporate IS and division IS assignments. First, cross-functional moves were explicitly encouraged as a way of nurturing employees. The high value placed on "striking a balance between industry and technical concerns" by corporate IS management was also signaled by the significant non-IS experience of recently promoted IS executives; the CIO and most of the eleven U.S.-based directors had served in company positions outside of the IS organization. Second, frequent job moves were formally encouraged for high-performing managers, including IS professionals. The "movement of people" was viewed as a "part of linkage," and job moves every eighteen to twenty-four months were not uncommon. The typical IS manager had strong cross-functional, interpersonal networks due to these rotation policies.

Performance appraisals for professional and managerial employees typically included *cross-unit sources of input*, as well as input from personnel outside of the direct reporting hierarchy. For the position of systems analyst, for example, at least one "outside" person would be included in the appraisal process; for IS manager positions, the evaluation process included input from several non-IS sources. This HR practice therefore incorporated Company F's core values on customer focus and teaming.

Appendix B: Survey Results on Importance* of Specific Mechanisms at Company C

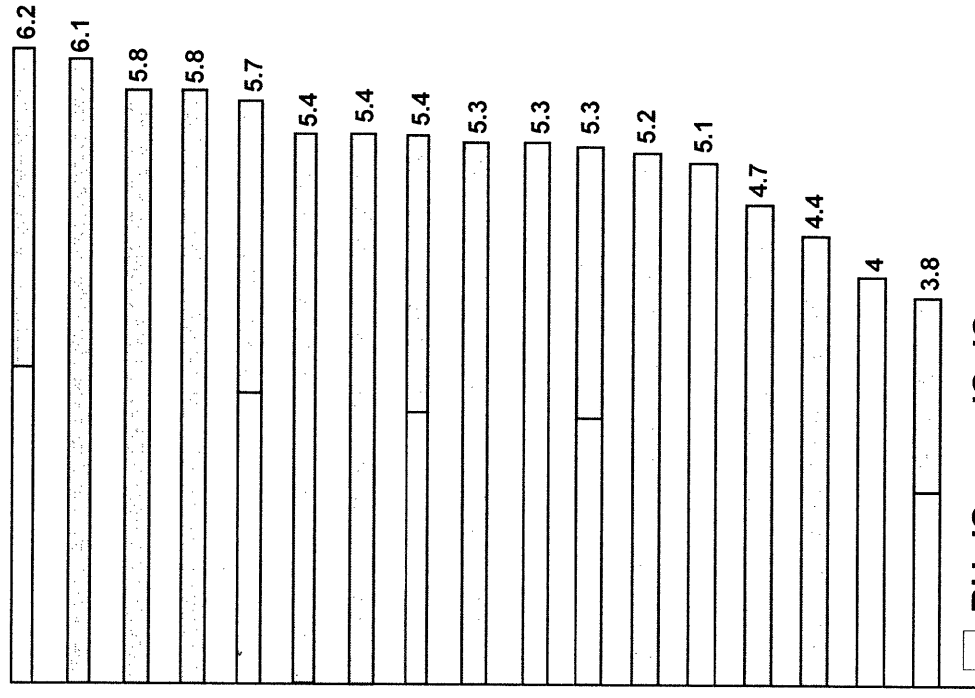


* Importance of each mechanism as a key to success for the firm's current IS governance structure (decision-making form) using a 7-point scale with 7= Extremely important, 1= Not at all important

Appendix C: Survey Results on Importance* of Specific Mechanisms at Company F

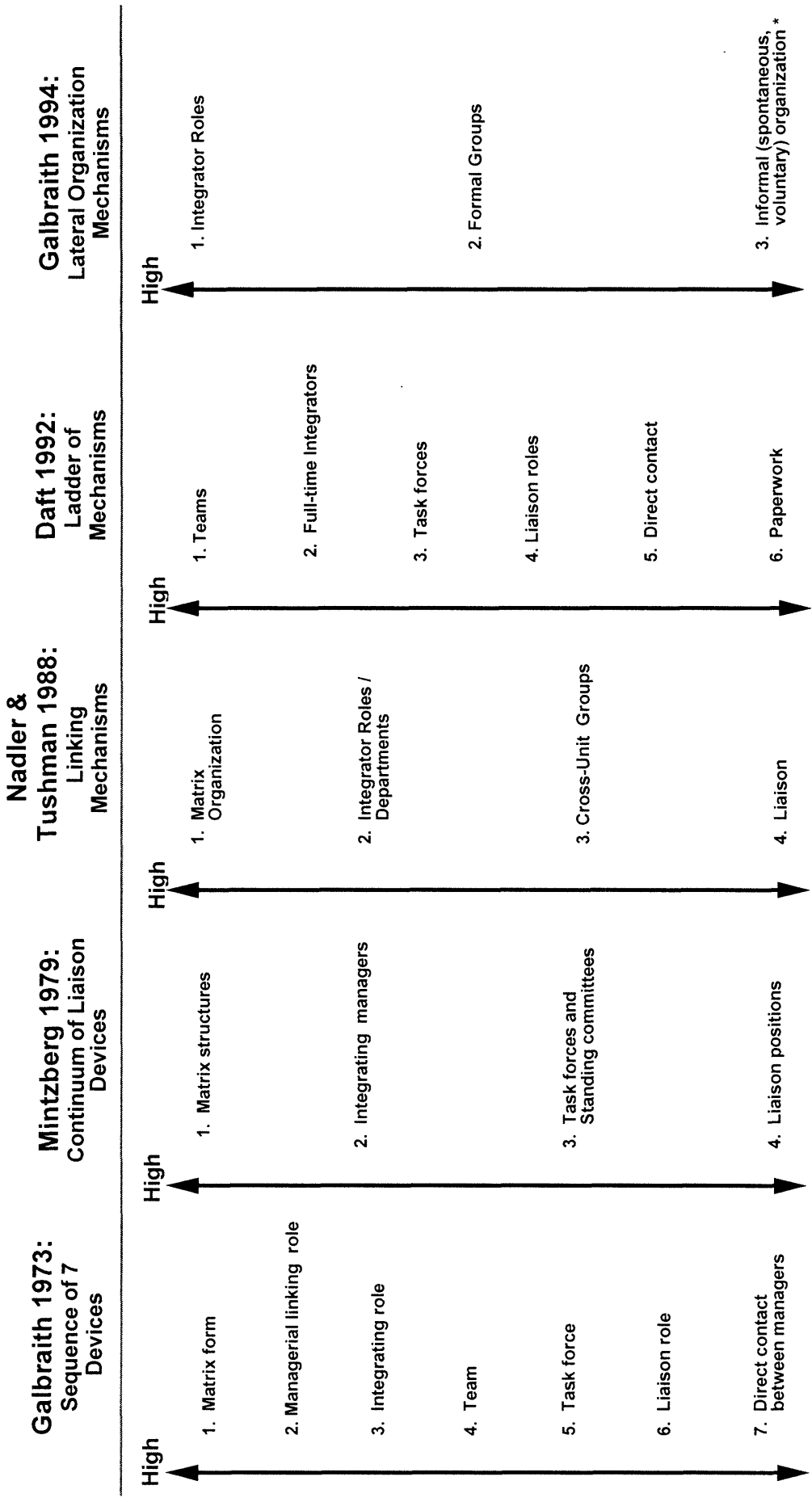
Type Specific Mechanism

	<u>Mean</u>	<u>s.d</u>
2a Director-level positions	6.2	0.97
2a Dotted-line report to CIO	6.1	1.27
1b Weekly CIO staff meetings	5.8	0.97
1b Systems personnel committee	5.8	1.20
4a Strong networks due to rotation	5.7	0.87
2b Standard-setting - methodology	5.4	1.51
3b T/D by corporate IS	5.4	1.13
4a Cross-functional moves	5.4	1.01
2b Standard-setting - acquisitions	5.3	1.50
3b T/D by divisions	5.3	1.00
4b Cross-unit sources for perf.	5.3	0.87
2b Data administration position	5.2	1.92
1a Advisory committee of sr. execs	5.1	2.09
2b Global IS planning position	4.7	1.66
3c E-mail system linking IS managers	4.4	1.81
3b T/D by human resources dept.	4.0	1.50
4a Frequent job rotations	3.8	1.92



* Importance of each mechanism as a key to success for the firm's current IS governance structure (decision-making form) using a 7-point scale with 7= Extremely important, 1= Not at all important

Figure 1: Continuua of Horizontal Linking Devices



- Low ability to handle information
- Low cost to organization
- Low strength of modification
- Low cost dependence on informal organization
- Low information processing capacity
- Low information capacity
- Low degree of horizontal coordination

* Network-building practices
 Interdepartmental rotation
 Physical co-location
 Interdepartmental events
 Information technology network
 Mirror-image organizational structure
 Consistent (cross-unit) reward & measurement practices

Table 1: Relevant Empirical Literature

Study/Date	Methodology	Mechanisms Studied			Findings
		Formal Groups	Formal Roles	Informal Mechanisms	
Drury 1984	Mailed survey Sr. DP executives (n=144)	Steering committee			Advantages attained by SC's depend on user representation and operating mode.
McKeen & Guimaraes 1985	Interviews MIS manager & Sr. business managers (n=32 co., 92 projects)	Steering committee			SC use associated with 1) large system projects for lower level tasks with little vertical integration and 2) proposals with a) cost / benefit analysis b) both tangible & intangible benefits.
Zmud & Lind 1986	Interview & mailed survey IS manager of end-user services (n=21)	Steering committee Task force User groups Tech. Assessment group	Information center Internal consultant User liaison User consultant	Training Newsletter User q-aire Pilot project	All twelve mechanisms being used for end-user computing management. SC most popular (n=19). Choice of mechanism linked to specific issues; most directed at hardware-related issues.
Doll & Torkzadeh 1987	Mailed survey MIS directors (n=456)	Steering committee			SC's associated with existence of systems devt plan and increasing sophistication of planning & budgeting practices. In large firms, SC's also associated with mutual agreement on devt priorities and long-term funding commitment.
Gupta & Raghunathan 1989	Mailed survey IS decision-makers (n=178)	Steering committee			SC use associated with four IS planning factors: 1) Integration of IS into business, 2) Hardware integration, 3) Achievement of planned goals, 4) Coordination of IS planning efforts.
Blanton et al. 1992	Case study (n=2 banks)	Formal groups (IS:IS)			Formal groups to coordinate decentralized IS units associated with more effective IT support.
Clark 1992	On-site interviews IS executives (n=30)	Steering committee		Physical dispersion	Physical dispersion of central IS resources, and SC with budget & operational control of projects are common mechanisms.
Raghunathan 1992	Mailed survey IS managers (n=62)	Steering committee			CEO membership on SC associated with perceived effectiveness of IS, alignment of strategic plans, and perceived importance of IS planning. Other top mgmt. membership assoc. with IS resource deployment tasks.

Table 1, continued

Study/Date	Methodology	Mechanisms Studied			Findings
		Formal Groups	Formal Roles	Informal Mechanisms	
Torkzadeh & Xia 1992	Mailed survey Telecom managers (n=137)	Steering committee (70% had BU representatives)			SC for telecommunications policy associated with higher amount of support for telecommunications function.
DeSanctis & Jackson 1994	Descriptive case study (n=1 oil co.)	Cross-functional team (IS: IS)	Annual IT conference Quarterly IT forums IT networks (groupware)		Complex coordination structures (e.g., cross-functional teams) in combination with complex computer-based communication systems (e.g., discussion databases) enable IT planning coordination across decentralized IS units. Informal mechanisms were insufficient in this context.
McKeen, Guimaraes, & Wetherbe 1994	Interviews MIS manager & Sr. business managers (n=60 co., 176 projects)	Steering committee			SC use for project selection (compared to decision-making by individual managers or single departments) associated with 1) larger and riskier projects with more organizational change and 2) formal cost/benefit analysis, but project scope not more cross-functional.
Saaksjarvi 1994	Mailed survey IS managers (Finland) (n=37)	Steering committee			A single SC may serve multiple roles. Importance of SC's rated higher than success. SC's associated with highest success ratings had systems project prioritization and budgeting roles.
Iacono et al. 1995	Structured observation Relationship managers (n=4)		Relationship managers		Middle-manager boundary-spanners, with no direct reports, had unstructured work environments and oral contacts primarily for informational purposes. Time with business clients and method of contact greatly varied.

Table 2: Mechanisms for Corporate/Division Coordination of the IS Function

Category #1:	<i>Formal Groups</i>
	Type 1a: Steering Committees Type 1b: IS Standing Teams
Category #2:	<i>Formal Roles</i>
	Type 2a: Cross-Unit Integrators Type 2b: Corporate IS Oversight Roles
Category #3:	<i>Informal Networking Practices</i>
	Type 3a: Physical Co-location Type 3b: Interdepartmental Events Type 3c: IT Networks
Category #4:	<i>Cross-Unit Human Resource Practices</i>
	Type 4a: Job Rotations Type 4b: Input to Performance Reviews

Table 3: Managers Interviewed by Company and Position

	Company C	Company F
IS Stakeholders		
CIO	1	1
IS Directors Corporate Division	2	2 2
Non-IS Stakeholders		
V.P. – Corporate Staff Function	1	1
V.P. – Group or Division	2	3
Total:	6	9

Table 4: Interview Results on Mechanisms for Corporate/Division Coordination

Company C		Company F	
BU: IS	IS: IS	BU: IS	IS: IS
#1: Formal Groups			
1a Steering Committees Steering committees at division level	1b IS Standing Teams- Corporate & Dispersed IS Quarterly IS director meetings Tri-annual IS operating reviews Annual IS strategic planning	1a Steering Committees Advisory committee of senior executives	1b IS Standing Teams - Corporate & Decentralized IS Weekly CIO staff meetings Bi-weekly systems personnel committee meetings
#2: Formal Roles			
2a Cross-Unit Integrators IS heads of systems development units		2a Cross-Unit Integrators Director-level positions for decentralized IS units Dotted-line report to CIO	2a Cross-Unit Integrators Director-level positions for decentralized IS units Dotted-line report to CIO
2b Corporate IS Oversight Roles Review of IT acquisitions Review of PC requests Equipment leasing contracts Standard-setting for PCs and LANs		2b Corporate Oversight Roles Global IS planning position Data administration position Standard-setting for IT acquisitions Standard-setting for systems dev/pt. methodologies	2b Corporate Oversight Roles Global IS planning position Data administration position Standard-setting for IT acquisitions Standard-setting for systems dev/pt. methodologies
#3: Informal Networking Practices			
3a Physical Co-location Co-location of IS directors Co-location of systems development units			
3b Interdepartmental Events IT demonstrations for corporate management Business T/D opportunities	3b Interdepartmental Events Technical T/D opportunities Technology conferences Director networking - external seminars	3b Interdepartmental Events T/D opportunities sponsored by HR dept. T/D opportunities sponsored by division	3b Interdepartmental Events T/D opportunities sponsored by corporate IS
3c IT Networks E-mail system linking IS managers	3c IT Networks E-mail system linking IS managers	3c IT Networks E-mail system linking IS managers	3c IT Networks E-mail system linking IS managers
#4: Cross-Unit Human Resource Practices			
4a Job Rotations Temporary job assignments in division IS career moves to division	4a Job Rotations Corporate-wide IS job listing	4a Job Rotations HR encouragement of cross-functional moves HR encouragement of frequent job rotations Strong, informal networks due to rotation policies	4a Job Rotations HR encouragement of cross-functional moves HR encouragement of frequent job rotations Strong, informal networks due to rotation policies
4b Input to Performance Reviews Annual customer survey	4b Input to Performance Reviews Corporate-wide IS performance awards Ranking of IS personnel	4b Input to Performance Reviews Cross-unit sources in evaluation process	4b Input to Performance Reviews Cross-unit sources in evaluation process
Totals: BU: IS	Totals: IS: IS	Totals: BU: IS	Totals: IS: IS
Categories: 4	Categories: 3	Categories: 4	Categories: 4
Types: 7	Types: 5	Types: 5	Types: 7
Specific Mechanisms: 13	Specific Mechanisms: 10	Specific Mechanisms: 8	Specific Mechanisms: 14
Totals: Company C		Totals: Company F	
Categories: 4	Categories: 4	Categories: 4	Categories: 4
Types: 9	Types: 9	Types: 8	Types: 8
Specific Mechanisms: 23	Specific Mechanisms: 23	Specific Mechanisms: 17	Specific Mechanisms: 17