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Herding Cats: The Role of Coordination Mechanisms in a Federated IS Governance Structure with Highly Autonomous Sub-Units

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HERDING CATS: THE ROLE OF COORDINATION MECHANISMS IN A FEDERATED IS GOVERNANCE STRUCTURE WITH HIGHLY AUTONOMOUS SUB-UNITS

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Abstract

Lateral mechanisms are used to promote coordination across independent, highly autonomous IS subunits in large, complex organizations. Effective coordination offers significant opportunities to gain economies of scale and scope while maintaining the benefits of sub-unit independence. The objective of this study is to develop a deeper understanding of the factors and contingencies that determine the choice and effectiveness of various coordination mechanisms in a federated IS governance context. This paper presents a review of the theoretical foundations of lateral relationships, the conceptual model of the study, a detailed review of the role of coordination mechanisms, and ends with the study's research model and specific research propositions. This paper describes an in-depth, longitudinal case study that is currently in process.

Keywords: Organization design, coordination mechanisms, federated IS governance, interdependence

Introduction

Large, complex organizations often utilize independent sub-units to pursue specific strategic and business objectives. These organizations still have compelling reasons for their sub-units to act in consistent, coordinated ways. Economic and budgetary pressures, policy and regulatory requirements, political influences, and customer and stakeholder priorities are some of the reasons organizations seek coordination between independent sub-units. Autonomous sub-units share pooled interdependence where each is mutually dependent on all other sub-units performing adequately for the entire organization to survive and thrive (Thompson, 1967). Organizations can benefit from the economies of scope and scale generated through coordination of activities between independent sub-units (Brown & Magill, 1998; Sambamurthy & Zmud, 1999; Tsai, 2002). These benefits are particularly important in the development and support of enterprise information technology (IT) infrastructure and information systems (IS). This research is focused on understanding the most effective mechanisms to enable coordination among autonomous IS sub-units, and the contingencies that impact the selection and effectiveness of various coordination mechanisms.

This paper presents a review of the theoretical foundations of lateral relationships, the conceptual model of the study, a detailed review of the role of coordination mechanisms, and ends with the study's research model and specific research propositions.

Theoretical Background

The research draws upon several streams of organization theory and IS literature that have examined the need for, creation, and use of coordination structures across sub-units. Specifically, the paper presents research on Federated Information System Governance structures and the need for enhanced lateral organizational coordination for increased efficiency and effectiveness within such organizations. Research on organization structure and organization norms is presented that suggests that within highly autonomous federated governance structures, organizational structure and norms act as inhibitors to coordination. To identify various means to achieve lateral coordination, research on organization information processing is reviewed and coordination mechanisms are identified as a viable method of achieving coordination. Figure 1 presents the conceptual model for the study.

Organizational Context - Federated Governance Structures

"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," (Brown, 1999). Prior IS literature identifies two primary IS resources to be managed: Systems Development and IT Infrastructure (Brown & Magill, 1998; Dixon & John, 1989; Zmud, Boynton, & Jacobs, 1986). Based on the distribution of decision making between corporate and the business units related to these two IS resources, three governance forms are also identified in this literature: 1) Centralized – the central or corporate entity has primary authority and responsibility for both IS resources; 2) Decentralized – sub-units have primary authority and responsibility for both IS resources; and 3) Federal (hybrid) – a corporate IS unit has primary authority and responsibility for IT Infrastructure resources and sub-units have primary authority and responsibility for Systems Development decisions (Brown & Magill, 1998; Dixon & John, 1989; Zmud et al., 1986). A federated IS structure refers to a design in which the locus of responsibility for the management of technology functions is highly centralized, but the locus of responsibility for the management of the use of technology is highly decentralized (Brown & Magill, 1994). Federated governance structures have been found in organizations that operate in single or related businesses seeking cost efficiencies from economies of scale and standardized infrastructures, and synergies across sub-units (Brown, 1999). The present research focuses on coordination mechanisms in this latter type of IS governance structure.

Inhibitors to Cross-Unit Coordination

Organizational structure incorporates the authoritative aspects of the organization including formal reporting relationships, policies and procedures, documented rules and sanctioning mechanisms (Galbraith, 1973). These elements of the regulative systems in an organization establish the formal rule-setting, monitoring, and sanctioning activities of an organization (Scott, 2001). The organization structure defines the components of an organization (sub-units), how the components are segmented and the connections between and within these components (Thompson, 1967). In a federated structure with independent and autonomous sub-units, corporate policies, procedures and reporting requirements are established to create consistency across the sub-units. However, these regulative processes do not address the coordination of activities between sub-units. In the absence of mechanisms to foster coordination, the organizational structure becomes a barrier to sub-unit coordination.

Organizational norms include the processes that shape and constrain social behavior within the organization including both norms and values (Galbraith, 1973). These values and norms constitute the normative systems through which an organization defines its goals and objectives and the acceptable ways to achieve them (Scott, 2001). The federated structure emphasizes freedom of action at the sub-unit level to fulfill its primary strategy and mission. Cultural norms work to reinforce this freedom by promoting and rewarding independent behaviors and autonomous actions. The normative systems actively promote sub-unit independence by institutionalizing decision making autonomy at the sub-unit level. Thus the organizational norms based on independence of action serves to undermine, or in the extreme to prohibit, attempts to coordinate activities across the sub-units.

As shown in Figure 1 and as the research suggests the formal organizational structure and the normative systems in a highly autonomous federated IS governance organization will act to deter IT sub-unit coordination. It is proposed that various coordination mechanisms will be used to overcome these regulative and normative influences, to promote increased sub-unit coordination, and to achieve improved organizational outcomes. Lateral Relationships, developed through the creation of formal and informal mechanisms, promote sub-unit coordination by supporting the identification of shared challenges related to IS and infrastructure, and providing a framework for developing common, coordinated solutions.

IT sub-units acting in a coordinated fashion will generate performance outcomes for the organization that are superior to the outcomes achieved through the actions of individual, independent sub-units. Performance outcomes are related to the fulfillment of opportunities for cross-unit IT-related synergies (Brown & Magill, 1998). Sub-unit coordination will be manifested in the development of common processes for the creation and on-going support of enterprise IS, the emergence of common technology platforms, and the leveraging of sub-unit development activities by other sub-units. "For a firm to realize economies of scope, administrative mechanisms or operating relationships must be established among its units to keep track of opportunities for synergies and to ensure exploitation of the associated economies of scope"(Sambamurthy & Zmud, 1999).

To the extent these lateral mechanisms are effective in generating these elements of coordination between sub-units, the organization will enjoy the potential for lower development costs for an enterprise IS, lower on-going support and maintenance costs, the ability to create broader and deeper IS solutions by coordinating systems development across IS sub-units, and the opportunity to optimize staffing to match development needs.

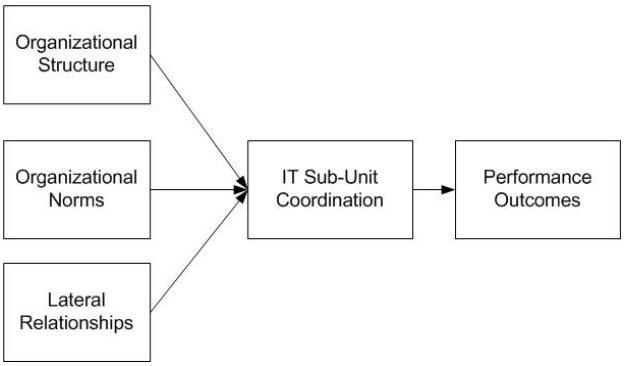

Figure 1 – Conceptual Model

Need for Coordination and Lateral Relationships

In an organization operating in similar businesses, sub-units operate independently in that the one sub-unit is not dependent on another sub-unit to complete tasks, but the characteristics of the tasks and task environments for many sub-units are very similar. Organizations are divided into subgroups or departments and for an organization to perform well, each department must perform its task, and the tasks must be coordinated with one another (Daft & Lengel, 1986). Likewise, Tushman and Nadler argue "the amount of task interdependence that exists between differentiated subunits is associated with the need for effective coordination and joint problem solving" (Tushman & Nadler, 1978). Thus, while they operate independently, sub-units have common information needs and task environments and would benefit from common or consistent solutions.

Cross-unit coordination can be effectively achieved through lateral relationships or coordination mechanisms (Galbraith, 1973). These are ways in which different parts of an organization are linked together to accomplish tasks collectively or consistently (DeSanctis & Jackson, 1994; Tsai, 2002). The design and implementation of coordination mechanisms are relevant to IT management in an environment of autonomous sub-units to ensure the efforts of sub-units are synchronized, to ensure sub-unit goals and operations are aligned with the entire organization, and so that efficiencies and knowledge-sharing regarding technologies can take place across sub-units (DeSanctis & Jackson, 1994). In such federal IT governance environments, the hierarchical reporting relationships create a structural barrier between corporate IS managers and sub-unit IS managers. Because the federal hierarchical design does not foster inter-unit collaboration, coordination mechanisms such as a standing IS team of corporate and sub-unit IS managers are likely to be of critical importance (Brown, 1999).

Coordination Mechanisms

Mechanisms for establishing lateral relationships have been segmented into two primary categories: 1) formal – processes for interactions sponsored, monitored and regulated by established organizational structures, and 2) informal – interpersonal interactions involving individuals and groups that arise voluntarily or spontaneously outside of formal structure or reporting relationships (Brown, 1999; Daft & Lengel, 1986; DeSanctis & Jackson, 1994; Galbraith, 1973; Tsai, 2002). The two types include the following mechanisms: 1) Formal or structural lateral mechanisms – rules and regulations, formal information systems, task forces, cross-functional teams, committees, integrating roles, and matrix designs (Brown, 1999; Daft & Lengel, 1986; DeSanctis & Jackson, 1994; Galbraith, 1973; Tsai, 2002); 2) Informal or non-structural lateral mechanisms - direct contacts, liaison roles, reporting, conferences, and spontaneous and voluntary groups (Brown, 1999; Daft & Lengel, 1986; DeSanctis & Jackson, 1994; Galbraith, 1973; Tsai, 2002).

Brown and Magill suggest the type of coordination mechanisms employed in an IS organization will be contingent upon: 1) business-level strategy, 2) the strategic role of IT for the business unit, 3) the degree of business unit manager IT knowledge, and 4) level of opportunities for IT-related synergies across business units (Brown & Magill, 1998). Each contingency represents demands and priorities on the organization and its structure within a different context. Contradictions in demands and priorities gives rise conflicting contingencies that must be resolved (Brown & Magill, 1998). Their proposed framework and propositions identified for resolving the conflicting contextual contingencies are the foundation for the current research.

Other research has provided additional support for the effectiveness of different coordination mechanisms within a federal IS governance context. For example, DeSanctis and Jackson (1994) found that the use of formal group coordination mechanisms increases coordination across decentralized sub-units with IS development responsibilities and Blanton, et al found sophisticated liaison groups enhanced sub-unit coordination (Blanton, Watson, & Moody, 1992).

Using the above literature as a backdrop, the current study will examine the following research questions:

1. What portfolio of coordination mechanisms provides effective coordination in highly autonomous federated IS environments (e.g., formal vs. informal roles)?

2. What determines which coordination mechanisms will be selected? The organizational design literature suggests that mechanisms are selected based on cost/benefit. What other organizational contingencies influence selection of mechanisms (e.g., culture, power of various groups, institutional norms, leadership, etc)?

3. Which factors determine whether a certain portfolio of coordination mechanisms will be effective?

Even though we will not posit propositions and hypotheses for all research questions, the research model presented in Figure 2 (and related propositions below) focuses on the interaction of formal and informal coordination mechanisms leading to the creation of sub-unit coordination.

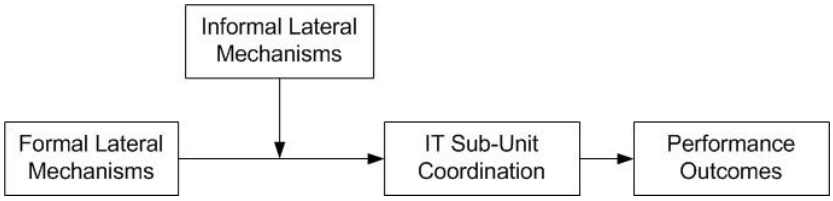

Figure 2 – Research Model

As discussed above, coordination among highly autonomous sub-units in a federated structure can lead to achieving economies of scope and scale in the implementation and support of IT infrastructure and IS. Creating common solutions across sub-units can eliminate duplicated efforts, improve implementation speed, and lead to more effective allocation of technical staff. Thus,

> *P1 – IT Sub-Unit coordination among highly autonomous sub-units in a federated IS governance structure will lead to positive IT performance outcomes.*

The need for coordination in a federated structure extends beyond coordinating IS Systems Development and Infrastructure (i.e., vertical coordination). Lateral coordination and collaboration by business and IS managers at the sub-unit level determine the ability to achieve economies of scope and development efficiencies across the sub-units. Since structural barriers to sub-unit coordination are inherent in a federated structure, formal mechanisms are required to achieve this collaboration. Formal mechanisms are also required to bridge the autonomy of the sub-units to facilitate coordination between central IT and the sub-units. We suggest that the most effective coordination mechanisms should include cross-functional teams of business and IT managers from both the sub-units and corporate levels. Therefore,

> *P2 – Formal lateral coordination mechanisms will increase IT sub-unit coordination among highly autonomous sub-units in a federated governance structure.*

Informal mechanisms play an integral role in coordinating activities across different sub-units, since these informal mechanisms are based on *social* interactions that give people more opportunities to share resources, ideas and knowledge (Tsai, 2002). The accumulation of an interaction history over time leads to familiarity with members in the coordination group, eliminating social uncertainty and leading to the development of trust-based relationships (Gefen, Karahanna, & Straub, 2003a, 2003b). However, these informal mechanisms are not likely to be effective in achieving coordination. For example, DeSanctis and Jackson found that while informal, voluntary coordination mechanisms fostered information sharing and problem identification in the short-term, they did not achieve the desired coordination outcomes across decentralized IT sub-units (DeSanctis & Jackson, 1994). While informal mechanisms are not expected to have a long-term effect on sub-unit coordination, informal coordination mechanisms such as interpersonal contacts, liaison groups, voluntary relationships and conferences will facilitate the effectiveness of formal lateral mechanisms:

P3 – The effect of formal coordination mechanisms on IT Sub-Unit coordination is moderated by informal coordination mechanisms.

Research Method

The proposed methodology is an in-depth, longitudinal case study. As is typical in case study research, theoretical reasons guided the selection of the organization of interest (Glaser and Strauss, 1967; Eisenhardt, 1989). The organization has a highly autonomous federated IS function. This organization provides a unique opportunity to study the phenomenon: top management is seeking better results from the IS function; the CIO is charged with achieving greater coordination among central IS and the various IS subunits as well as among the various IS subunits themselves; and a team established by the COO and led by the CIO is identifying and implementing various structural and non-structural, formal and informal, vertical and horizontal coordination mechanisms. The organization has already agreed to participate in the study.

An in-depth case study affords focus on attaining a rich understanding of the *dynamics* of the phenomenon (Eisenhardt, 1989). We would like to gain an in-depth understanding not only of the coordination mechanisms employed but also of the implementation hurdles (e.g., reactions of IS units, political plays, etc) and effective and ineffective implementation strategies (e.g., influence tactics and leadership behaviors) in deploying these coordination mechanisms in a highly autonomous environment.

Data will be collected for a period of approximately six to nine months starting in November 2003. Data will be gathered via a number of different mechanisms and sources: (a) observation of meetings between the CIO and unit IT directors; (b) observation of retreats between CIO and unit IT directors; (c) weekly interviews with the CIO; (d) interviews with some unit IT directors; (e) review of archival data such as memos, reports, and organizational chart; (f) observations of meetings of the cross-functional coordination team. We will have the support of the CIO to help us obtain any other data that we may need.

The study will be conducted using well-established guidelines for case study research (e.g., Glaser and Strauss, 1967; Yin, 1984; Eisenhardt, 1989; Lee, 1989) and data will similarly be analyzed using established methodologies for qualitative data analysis (e.g., Miles and Huberman, 1984).

References

Blanton, J. E., Watson, H. J., & Moody, J. (1992). Toward a Better Understanding of Information Technology Organization: A Comparative Case Study. *MIS Quarterly, 16*(4), 531-555.

Brown, C. V. (1999). Horizontal Mechanisms Under Differing IS Organization Contexts. *MIS Quarterly, 23*(3), 421-454.

Brown, C. V., & Magill, S. L. (1994). Alignment of the IS Functions With the Enterprise: Toward a Model of Antecedents. *MIS Quarterly*.

Brown, C. V., & Magill, S. L. (1998). Reconceptualizing the Context-Design Issue for the Information Systems Function. *Organization Science, 9*(2), 176-194.

Daft, R. L., & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Management Science, 32*(5), 554-571.

DeSanctis, G., & Jackson, B. M. (1994). Coordination of Information Technology Management: Team-Based Structures and Computer-Based Communication Systems. *Journal of Management Information Systems, 10*(4), 85-110.

Dixon, P. J., & John, D. A. (1989). Technology Issues Facing Corporate Management in the 1990s. *MIS Quarterly, 13*(3), 247-255.

Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review, 14*(4), 532-550.

Galbraith, J. (1973). *Designing Complex Organizations*. Reading, MA: Addition-Welsey.

Gefen, D., Karahanna, E., & Straub, D. W. (2003a). Potential and Repeat e-Consumers: The Role of Perceived E-vendor Trustworthiness vis-à-vis TAM. *IEEE Transactions on Engineering Management, 50*(3), 307-321.

Gefen, D., Karahanna, E., & Straub, D. W. (2003b). Trust and TAM in Online Shopping: An Integrated Model. *MIS Quarterly, 27*(1), 51-90.

Sambamurthy, V., & Zmud, R. W. (1999). Arrangements for Information Technology Governance: A Theory of Multiple Contingencies. *MIS Quarterly, 23*(No. 2), 261-290.

Scott, W. R. (2001). *Institutions and Organizations, 2nd Ed.* Thousand Oaks, CA: Sage Publications.

Thompson, J. D. (1967). *Organizations in Action*. New York: McGraw-Hill Book Company.

Tsai, W. (2002). Social Structure of "Coopetion" Within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing. *Organization Science, 13*(2), 179-190.

Tushman, M. L., & Nadler, D. A. (1978). Information Processing as an Integrating Concept in Organizational Design. *Academy of Management Review*, 613-624.

Zmud, R. W., Boynton, A. C., & Jacobs, G. C. (1986). The Information Economy: A New Perspective for Effective Information Systems Management. *Data Base, 18*(1), 17-23.