

THE GOVERNANCE AND STRUCTURE OF THE INFORMATION TECHNOLOGY ORGANIZATION IN THE GLOBAL ECONOMY

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ABSTRACT

As organizations have become more complex over the past twenty years, so have the structures and governance mechanisms that control them. Similarly, with the growth of various computer technologies, IT has become increasingly complex in terms of hardware, software, and architecture. Thus, the governance and structure of IT reflects both organizational and technological changes. During the 20th century, four major governance structures have emerged: centralized, centralized hybrid, decentralized hybrid, and decentralized. However, not all IT organizations are entirely one of the four structures. Instead, IT structures are hybrid arrangements, where the three major functions of IT: infrastructure management, use management, and project management are governed by different structures, depending on the nature of the corporation. Many different variables influence how an IT department governs and structures themselves, including corporate governance, economies of scope, and absorptive capacities. Nonetheless, as corporate structures continue to evolve and technology becomes increasingly complex, IT governance and structure will continue to adapt to meet the changing needs of tomorrow's global business.

Keywords: governance, organizational structure, infrastructure management, organizational alignment

EVOLUTION OF STRUCTURE

During the past 20 years, Information Technology structure has become increasingly more complex. In the same time period, corporate structures have also become more complicated. Historically, up until the 1920's, corporate structures were mainly centralized. Centralized organizations can be conceptualized as large, formalized, functional bureaucracies with standardized work processes. In the 1920's, companies began setting up decentralized, multidivisional structures in order to become more efficient, with the leaders of the movement including the E.I. du Pont de Nemours and Company; General Motors Corporation; Standard Oil Company; and Sears, Roebuck, and Company [6].

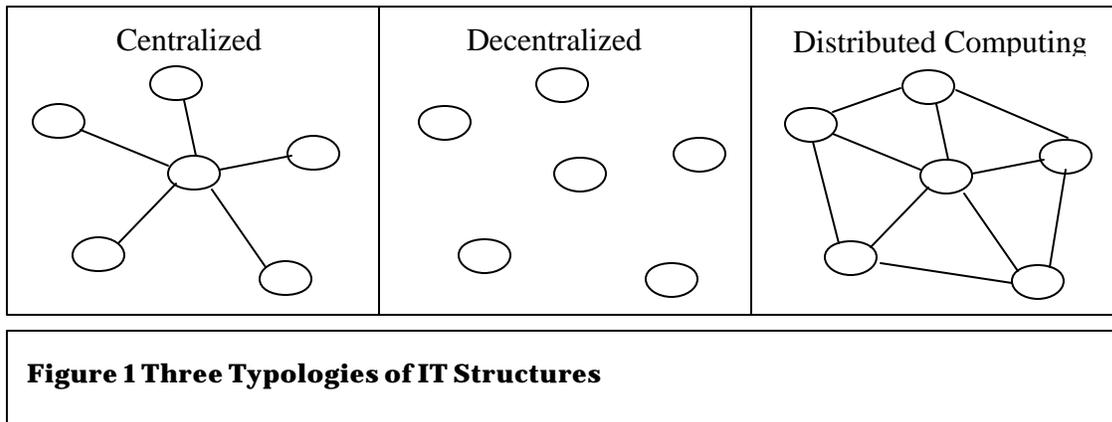
Twenty years later, in 1946, Peter Drucker visited General Motors again to examine their corporate structure. After interviewing executives at GM, Drucker noticed a change in the corporate structure. He ascertained that "information and decisions must flow continually in two directions: from central management to the divisions, from the divisions to central management" [8, p. 60]. Thus, Drucker concluded, a more accurate description of GM's structure would be to characterize it as a federal union between centralization and decentralization.

By taking the research of Drucker and Chandler [6] together, there are three main types of corporate structure: centralized, decentralized, and a federal union. These 3 types of structures were later applied to Information Technology departments and identified as centralized,

decentralized, and distributed. Under the context of networking and processing of data, these three hardware structures can be defined as:

- *Centralized computing:* A system that is based on processors located in one site (except for microcomputers and remote workstations)
- *Decentralized computing:* A number of processors deployed in different locations, not connected to a common network and functioning autonomously
- *Distributed computing:* A number of processors deployed in different locations and linked in a common communications network [1].

These are displayed graphically below in Figure 1.



Despite the growth in the diversification of corporate structure through the 1960's and 1970's, IT structure was mainly centralized [20]. Blumenthal [2] argued, "Computers offer the opportunity to substantially enhance rather than further erode the importance of the individual within the enterprise. Whether or not this ultimately occurs, a period of increasing centralization will first have occurred, and has already started." However, in the 1980's, researchers discovered that, with the advent of client-server architecture, the distribution of data processing activities was spreading, and IT resources and responsibility for IT activities had finally begun to be decentralized. Researchers also discovered that not all IT activities devolved and it was concluded that the federal IT management structure was then the dominant structural form in multi-business companies. From a structural perspective, the federal IT management structure is defined as:

"A distributed function, with each business unit containing and largely controlling its own capability. However, there is in addition a central IS unit reporting to corporate management which has responsibility for defined aspects of policy and architecture across the organization, and which may deliver some common or shared services. It may or may not be coincident with the IS unit for corporate HQ" [11, p. 162]

In an effort to further sharpen the typologies of IT structure, researchers proposed a four-factor model of IT structure. The new typology included a centralized and decentralized hybrid. The centralized hybrid has 50% of IT responsibility devolved, while the decentralized hybrid has 70-

80% of IT responsibility devolved. This is in contrast with the centralized structure having 10-15% of IT devolved and the decentralized structure, where all activities are fully devolved. The hybrid solutions are what Drucker would label a federal union of centralized and decentralized governance structures. Table 1 displays the four IT management structures.

Table 1 Profile of the Four IT Management Structures

| IT Management Structure | Average amount of corporate IT management responsibility¹ | Process decentralization² | Intercomputer communication² | Amounts of Shared Data and applications² | Organizational Structure² |
|--------------------------------|---|---|--|--|---|
| Centralized | All | Low | Low | Low | Functional |
| Centralized Hybrid | Most | Low | High | High | Functional |
| Decentralized Hybrid | Some | High | High | High | Matrix/Product |
| Decentralized | None | High | Low | Low | Product |

References: 1: Main and Short [14] 2: Fiedler, Grover, and Teng [10]

STRUCTURES FOR THE GLOBAL ECONOMY

Nonetheless, it is not enough to simply characterize four typologies of IT structures, for more modes of IT structure have been found in practice. In order to further investigate the typologies of Information Technology, the various spheres of IT activities need to be input into the understanding of the structures. Sambamurthy and Zmud [16, p. 262] explain these three general IT activities as:

- *IT infrastructure management*: "decisions that address the nature of hardware and software platforms, annual enhancement to these platforms, the nature of network and data architectures, and the corporate standards for procurement and deployment of IT assets"
- *IT use management*: "decisions that address applications prioritization and (short-term and long-term) planning, budgeting, and the day-to-day delivery of operations and services"
- *Project management*: "blending knowledge of IT infrastructure capabilities and capacities with knowledge associated for the conceptualization, acquisition, development, and deployment of information systems applications"

In deciding what structure to utilize for these IT activities, there are typically three stakeholders that govern IT decisions: corporate IT, divisional IT, and line management. Governance represents "an organization's IT-related authority pattern" (Sambamurthy and Zmud, 1999). Thus, when the three activities of IT are governed by corporate, divisional, and line management in the three types of structures (centralized, decentralized, and combining the two hybrids to form a federal structure), patterns emerge in the locus of authority as shown in Table 2.

Table 2 Modes of IT Governance Feasible in Practice (Adapted from Sambamurthy and Zmud [16])

| Centralized Governance Mode | | | | | |
|--------------------------------------|---|----------------------------------|---|-------------------|-------------------|
| Spheres of IT Activities | | | Patterns in the Locus of Authority | | |
| IT infrastructure | | | Corporate IT | | |
| IT use | | | Corporate IT | | |
| Project management | | | Corporate IT | | |
| Decentralized Governance Mode | | | | | |
| Sphere of IT Activities | Patterns in the Locus of Authority | | | | |
| | Pattern D1 | Pattern D2 | Pattern D3 | Pattern D4 | Pattern D5 |
| IT infrastructure | Divisional IT | Divisional IT | Divisional IT | Divisional IT | Line management |
| IT use | Divisional IT | Divisional IT | Line management | Line management | Line management |
| Project management | Divisional IT | Line management | Divisional IT | Line management | Line management |
| Federal Governance Mode | | | | | |
| Spheres of IT Activities | Patterns in the Locus of Authority | | | | |
| | Pattern F1 | Pattern F2 | Pattern F3 | | |
| IT infrastructure | Corporate IT | Corporate IT | Corporate IT | | |
| IT use | Corporate IT | Divisional IT or line management | Divisional IT or line management | | |
| Project management | Divisional IT or line management | Corporate IT | Divisional IT or line management | | |

In attempting to determine why patterns exist within the different modes, many explanations have been offered in IT research including types of industry, firm size, corporate strategy, and corporate structure [9, 15]. However, current research is proposing that there is not just one reason for why patterns exist. A contingency model is needed in order to better understand why companies chose a particular IT governance system. The categories of factors include:

- Corporate governance, including overall governance mode (centralized vs. decentralized) and firm size (small vs. large)
- Economies of scope, including diversification mode (internal growth vs. acquisition growth), diversification breadth (related markets vs. unrelated markets), and exploitation strategy for scope economies (enterprise-wide consolidation of assets vs. enterprise-wide line/IT partnerships)
- Absorptive capacities, including IT knowledge (low vs. high)

When these three factors are considered in conjunction with one another, a more robust explanation of firms' IT governance structures can be found.

Research into governance has further evolved into examining the relationships between the business units and IT. Within decentralized firms, IT often implements coordination mechanisms [5], where a position such as a relationship manager is placed within the business units to understand the technology-related projects that are needed within that specific context. The move toward context-specific perspectives of governance [4] has resulted in the creation of a different conceptualization of governance, where the objective of research is to understand “the managerial rationale for designing and evolving specific organizational arrangements in response to an enterprise’s environmental and strategic imperatives” [17] rather than understanding how activities are governed. This movement marks a shift in governance research from an attempt at controlling user activity to becoming partnerships within firms using a specific mechanism. Recent research has sought to understand the architectures in place that firms are using, along with success metrics that are used to ensure business-IT alignment success [18].

As corporate structures continue to evolve, so will IT governance and structures. Many new organizational forms will affect the future of IT. Some future areas of interest to IT researchers include studying the phenomenon of flatter and more flexible overall organizational forms and the role that these new structures will play on IT governance. Further, with frequent acquisitions and spin-offs being commonplace in American business, these changes will have profound impacts on the future of IT. Lastly, with the rise of the Internet, virtual linkages are being created across organizational boundaries that will prove to be a challenge for IT. Thus, from the centralization of the past to decentralized structures in the 1920's to the hybrid structures that exist today, structure of IT has and will continue to evolve and prove to be challenging for those that govern its' existence.

IMPLICATIONS FOR MANAGEMENT

The research on the governance and structure of Information Systems has implications for management. Management must realize that many forms of structure and governance exist for IT. While many options exist, there are a few guidelines for management to follow. IT structure must:

- Remain in alignment with organizational and environmental contexts
- Reflect current decision-making processes in their organizations.
- Not be deficient in their capabilities, for the influence of IT structure can be overridden by IT deficiencies.
- Reflect the nature of the integration and structure of the organization. A decentralized IT function would be inappropriate in a centralized corporation and, conversely, a centralized IT style would be inappropriate in a decentralized company.
- Reflect the competitive strategy of the organization.

As managers seek to evaluate the structure of the IT function, they must also look at the broader organizational environment and not be afraid to transform the IT department to better adapt to the organization. Management must realize that they are not constrained to a particular governance solution. Hybrid solutions exist that will allow them to better serve the needs of the individual business units. However, the key to IT governance decisions is communication and a

full understanding of the business unit and organizational structure. The communication must result in sharing of knowledge, commitment, and decision-making. By analyzing the various elements of the organization, the best fit between IT and organizational structure can be achieved. The results of a perfect "fit" between organizational and IT structure will be an increased ability to better meet the needs of the organization, an increased likelihood of successful implementation of future IT projects, and the ability for IT to become a strategic partner in the future of the organization.

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