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Determining Current IT Practices Among IT Departments: A Conceptual Framework

Sock Chung
Auburn University

Charles Snyder
Auburn University

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Sock H. Chung
Auburn University
schung@business.auburn.edu

Charles Snyder
Auburn University
snyder@business.auburn.edu

Abstract

An information technology (IT) department provides the foundation of shared IT capabilities upon which the entire business depends. In addition, the department provides the organization with tangible benefits and a continuity of business practices. Despite the widely held belief that IT is fundamental to an organization's survival and growth, few studies have focused internally on IT departments. Researchers and practitioners need to take note of the potential value of understanding IT departments.

This paper proposes a method to develop a conceptual framework of the IT department domain and an investigation of how IT departments process business requirements in the organizations. Using the framework, this paper outlines how one explores current practices among IT departments. The framework includes the four following dimensions of the department domain: IT alignment with business, IT infrastructure characteristics, IT applications and IT internal effectiveness.

Keywords: IT alignment with business, IT infrastructure, IT applications, IT internal effectiveness

Introduction

IT provides organizations the opportunity to shape competitive strategies and support the enterprise in its continuing operations. As IT development has grown, the budgets for IT have been growing rapidly. For example, almost 40 percent of United States capital spending was used to acquire IT (Roach, 1991). Saunders and Jones (1992) noted that the annual investment in IT and related technology represents approximately one third of total corporate capital spending. At the center of IT investments is the IT department. The department's task has evolved from simple electronic data processing, to management information systems to information resource management. This paper addresses an approach to answer two basic questions: "What and how are IT departments doing to support their organizations?" In order to investigate the IT department, it is useful to develop a framework on what constitutes the IT department domain and to determine how the department processes business requirements. After reviewing key IT issues in management and organization theory from the literature, this paper presents a framework to define the domain of an IT department construct and identify appropriate measures in order to operationalize the construct.

Theoretical Framework of the It Department Domain

Although during the past two decades various studies by the Society for Information Management (SIM) have addressed critical issues in IT management (Brancheau, Janz & Wetherbe, 1996), those issues were seldom directly linked to the domain of IT departments. This paper presents a conceptual framework for the linkage between those issues and the IT department domain.

IT department is defined as an organizational unit consisting of groups of two or more IT people who coordinate their activities in a systematic manner to support their organization's objectives. Similarly, Sanders and Jones (1992) noted that the Information Systems (IS) department is synonymous with the IS function, and they defined the IS function to include all office information systems groups and departments within the organization. An IT department provides the foundation of shared IT capabilities upon which the entire business depends. The department supports the organization with many tangible benefits and enables a continuity of business practices. Also, changes in IT have been commensurate with changes in an organization, while the need for innovation and flexibility of the organization has fostered changes in IT. Consequently, researchers and practitioners have taken note of the potential value of better understanding an organization's IT department.

Development of the It Department Domain Construct

IT has become an integral part of the organization and is a key strategic weapon for maintaining competitiveness. Donovan (1989) stated that linking IT (e.g., information systems, computer operations, telecommunications, office automation) to the business is a matter of survival. Further, IT has been both the cause and effect of some organizational changes. Organizational structures are changing, and the changes consequently affect the structure of the IT department.

The capabilities evidenced by IT characteristics can provide companies with tangible benefits and a continuity of business practices (Kettinger et al., 1994). These characteristics provide a foundation for organizations to be competitive within their respective industries. Kettinger and his colleagues (1994) suggested that one of the defining structural IT capabilities that seem to make a difference in creating and sustaining competitiveness is the technological platform or infrastructure of the organization. An organization's IT infrastructure is fundamental for provision of the flexibility necessary to adapt to the rapidly changing environment. The components of an organizational IT infrastructure include networks, databases, and applications (Duncan, 1995). McKay and Brockway (1989) suggested that an IT infrastructure is the enabling foundation of shared IT capabilities upon which the entire business depends. The value of the IT infrastructure is well recognized among business organizations. For example, Broadbent and Weill (1997) noted that IT infrastructure expenditures account for an average of over 58 percent of organizational IT budgets, with the percentage growing at about 11 percent per year in recent years.

Historically, application systems evolved from transaction processing systems (TPS), through management information systems and decision support systems, to today's enterprise systems and e-commerce applications. In the 1960s, the primary function of IT departments was to automate existing manual systems such as payroll, accounting, and order entry. These automated activities, involving repetitive, high-volume transactions based on applying automatic rules, computations, and processes displaced many relatively low-level administrative or clerical staff members (Keen, 1995). Today, IT applications are no longer used only to process data and to provide management information reports. Both the academic and trade literature state that enterprises use IT applications to improve productivity, to enhance performance and reduce costs (Earl, 1989; Luftman et al., 1993; Smith and Mckeen, 1993), to enable new ways of planning, organizing, and controlling (Earl, 1989), to support existing business strategies (Saunders & Jones, 1992), to gain competitive advantage (Earl, 1989; Saunders and Jones, 1992; Smith & McKeen, 1993), to create new business opportunities (Earl, 1989; Smith & McKeen, 1993), to improve customer service and enhance product and service quality, and to integrate supplier and customer operations (Luftman et al., 1993). Each application in the current portfolio in IT departments has an importance, a cost, a technical quality and a management value. This means that the IT departments have an area that is measurable along these factors.

It is necessary to measure internal IT department effectiveness before measuring IT effectiveness for the organization. Organizations are spending billions of dollars on IT through IT departments. Some reports estimate one-third to one-half of capital expenditures in the U.S as being spent on IT (Panko, 1991). However, many chief executive officers question IT's contribution to their organizations (Saunders & Jones, 1992). Without measuring wider scopes of the internal effectiveness of an IT department, the department cannot be adequately evaluated by the organization's management, and can result in misguided decisions regarding acquisition, design and delivery of IT applications and services. The IT department should be concerned with the internal utilization of resources. From two previous studies of IS literature (Saunders and Jones, 1992; Grover et al., 1996), the three most frequently cited measures of internal IT department performance are operational efficiency, adequacy of systems development practices and information quality. With the large investment in IT departments which develop and maintain competitiveness for their respective organizations, it becomes necessary to measure internally, whether the departments are actually doing the jobs for which they are designed.

The discussions above address four dimensions of the IT department domain for IT alignment with business, IT infrastructure, technology applications, and internal IT effectiveness. These were initially proposed by Niederman et al. (1991) when classifying key IT issues of the 1986 and 1989 SIM studies into four groups. Recently, Gottschak (2000) used the same dimensions to predict key IT issues in management around the world. We propose exploring the linkage between those issues and the IT department domain in order to investigate current practices among IT departments.

Discussion

The four dimensions above can help explain the relationship between technology and organizations as Leavitt (1965) did with technology, people, structure, and task. These dimensions are applied to the internal analysis of the IT department. Each of the four dimensions is elaborated on in the following section.

IT Alignment with Business

This dimension deals with the concerns of IT strategy as to how the department is structured to support other business functions within the organization. An array of previous studies has discussed the IT alignment problem with IT organizational structures (e.g., Brown & Magill, 1994; Maglitta & Mehler, 1992; Von Simson, 1990). This paper focuses on two factors: the location of IT personnel (number of IT personnel working in the user areas versus number of IT personnel working at the data processing center), and the reporting relationships between IT personnel and business managers. These two factors can be used to examine IT's organizational structure within a firm. The structure of the IT department can be considered "centralized," "decentralized," or "hybrid" based on the physical location of IT personnel within an organization and on the reporting relationships of the IT staff. If the IT function in the firm is centralized, the IT department serves all business groups. The department maintains tight control over planning, application development, network, hardware/software, and data, while all IT personnel are physically located in the department and report to IT management. In the decentralized structure, some organizations place IT processing in the areas it most affects. User groups control their own data and maintain decision-making authority in application development, network, hardware/software, and data. IT personnel are often located in the user areas and report to the user management. The hybrid structure can be referred to as an intermediate arrangement. In this structure, the IT department makes most decisions on hardware/software and application development priorities. This discussion leads to the following question for needed research:

Question 1: What is the organizational structure (centralized, decentralized or hybrid) of the IT department based on the physical location of IT personnel and the reporting relationship between IT personnel and the business functions in the organization?

IT Infrastructure

This dimension deals with technology concerns and focuses on the integration of technology components to support basic business needs. The IT infrastructure characteristics include infrastructure flexibility. Duncan (1995) wrote, "one firm's infrastructure makes strategic innovations in business process feasible, while the characteristics of competitors' infrastructure may likewise cause their inability to imitate the innovation rapidly enough to mitigate the first mover's advantage. This set of characteristics of IT infrastructure has been loosely described as infrastructure flexibility" (p. 38). In the study, four previously identified independent variables of IT infrastructure flexibility are considered as well. These four variables are modularity, compatibility, connectivity, and IT personnel skills, representing both technical and human aspects of IT infrastructure characteristics (Broadbent & Weill, 1997). A technical aspect of IT infrastructure is often mentioned when practitioners and researchers discuss IT infrastructure. Duncan (1995) suggested that IT infrastructure flexibility is closely related to the technical factors of compatibility, connectivity, and modularity. Compatibility is the level of consistency found in the IT infrastructure throughout the organization (Duncan, 1995; Keen, 1991). Tapscott and Caston (1993) suggested that IT compatibility helps break down organizational walls, empower employees, and make data, information, and knowledge in the organization readily available. Connectivity is defined as the ability of any technology component to attach to any of the other components inside and outside of the organizational environment (Byrd & Turner, 2000). Tapscott and Caston (1993) emphasized that IT connectivity enables seamless and transparent organizations to be independent of time and space, and it is one of the major factors that can facilitate today's e-business among organizations in the global market. Most software seems to embed the concept of modularity in order to satisfy the business requirements of many organizations.

The human IT infrastructure aspect includes IT personnel skills for human and organizational skills, expertise, competencies, knowledge, commitment values, norms, and organizational structure (Broadbent & Weill, 1997). Based on the discussions above, we need to examine the level of IT infrastructure flexibility in an organization considering the four factors of compatibility, connectivity, modularity and IT personnel skills. This discussion leads to the following question for needed research:

Question 2: What is the extent of compatibility, connectivity, modularity and IT personnel skills representing the characteristics of IT infrastructure flexibility in the IT department?

Technology Applications

This dimension focuses on the business application of specific information technologies, and addresses the current and future application portfolio in the IT department, including transactional systems (e.g., TPS), informational systems (e.g., MIS, DSS), strategic systems (e.g., data mining), enterprise systems and e-commerce applications. The first three have been recommended by Weill and Broadbent (1998) to classify IT application portfolios, and the last two have been popular applications among practitioners and researchers since the late 1990's. Organizations can benefit from the use of the IT applications in several ways. They can, for example, save inventory holding costs by reducing the amount of inventory, reducing the working hours, and lowering their response time to market demands while using the IT applications. Since each application system in the portfolio

has a perceived importance for costs, technical quality, and frequency of use, this study examines current application portfolios among IT departments. This discussion leads to the following question for needed research:

Question 3:   What is the extent of applications portfolio implementation for transactional application systems, informational application systems, strategic application systems, enterprise systems, and e-commerce application systems in the IT department?

IT Internal Effectiveness

This dimension focuses on the internal IT functions with those essential activities comprising the bulk of the department's work. Finding new approaches to solving business problems, shortening throughput cycles, and delivering higher quality solutions are all actions required to ensure success in information systems organizations. This study focuses on IT service quality, information systems development methodologies, and outsourcing among IT departments.

IT departments have always had a service role because they assist users in converting data into information. Stylianou and Kumar (2000) recommended an IS/IT quality framework to IT management with six components of IS/IT. The six components are software quality, data quality, information quality, administrative quality and service quality. Similarly, Delone and McLean (1992) introduced six independent variables for system quality, information quality, information use, user satisfaction, individual impact, and organizational impact in their information systems success model. In their model, the desired characteristics of the system quality produce the information quality, and the desired characteristics of the information quality include accuracy, meaningfulness, and timeliness. In order to measure the internal effectiveness of an IT department, it seems appropriate to investigate how a senior IT manager evaluates his or her IT department service quality for data and information quality, and system quality. This discussion leads to the following question for needed research:

Question 4:   What is the extent of data and information quality, and system quality representing the level of user support by the IT department?

Conclusion

The current IT practices in the IT department deserve more attention from practicing managers and scholars. This paper focuses on the IT department domain construct. The domain of IT departments could be defined using content analysis of the IT and organization science literature. The domain includes IT alignment with business, IT infrastructure characteristic, technology applications, and internal IT effectiveness. This paper addresses the need for a definition of the current IT practices and a compilation of a list of related characteristics and proposes relevant questions for future research. The purpose of this paper is to provide a sequential framework on how researchers and practitioners can approach a better understanding of current IT practices among IT departments.

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