A CONTINGENCY-BASED
APPROACH TO ASSESSING THE
CONCEPT OF THE
CHIEF INFORMATION OFFICER

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Summary

What factors should an organization take into consideration when deciding whether to establish the position of the chief information officer (CIO)? A review of the literature has yielded a set of ten factors that are considered to have been the driving force behind the development of the CIO as a concept. These same factors form a contingency model that can be used by an organization to determine its need for a CIO. The environmental, organizational, and strategic elements contained in the model serve to highlight an organization's management needs with regard to technology. The prescriptions of the model are then validated against an organizational survey, the results of which further illustrate the differences between those organizations that have embraced the CIO concept and those that have not.
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Introduction

Business and popular literature abound with accounts of how the application of information technologies has brought about sweeping changes in markets, strategies, structure, and the basic ways firms conduct their business. As business functions and such technology become inextricably linked, executives are increasingly focusing their attention not on the technologies themselves, but on the issues involved in their management. One such issue is the concept of the chief information officer (CIO). By now, many are familiar with the duties and functions of a CIO, an individual responsible for taking a leadership position with respect to information technologies and management within the organization. What may be less clear are those factors that compel a particular organization to establish the position of CIO within its hierarchy. A correlation should exist between those factors considered to be reasons for the advent of the CIO concept and specific characteristics of organizations that have adopted the CIO in function if not in title. Once the factors have been identified and the correlations established, a contingency model can be developed to aid organizations in making the decision of whether or not to establish the position of CIO.

Methodology

In pursuing this research, a two-pronged approach was utilized. First, an extensive review of the literature covering work of over eighty-five authors (see attached bibliography) was conducted. This review yielded a set of factors that have contributed
to the advent of the CIO. These factors were then used as inputs to a contingency model designed to illustrate why organizations are establishing the position of CIO. Second, a survey was sent to twenty-five major corporations. Of the twenty-five, fourteen agreed to participate in the study. The survey was comprised of a series of questions to be answered by the senior information systems (IS) executive within each participating organization. This survey was either completed in written form or via telephone interview. Ten of the executives elected to participate via the telephone interview. Of the fourteen executives surveyed, only two actually hold the title of CIO. The following industries are represented in the sample: financial services, banking, publishing, petrochemicals, consumer products, food processing, insurance, and utilities.

The findings of the literature review will be discussed first, followed by the presentation of the contingency model. Then, the results of the organizational surveys will be assessed in light of the aforementioned model.

Results of Literature Review

After conducting the review of the literature, ten contributing factors to the advent of the CIO became clear. These factors can be classified into three categories: environmental, strategic, and organizational. Each category will now be discussed.

Environmental - The environment in which an organization operates necessarily has an impact on it, just as an organization in turn has an impact on its environment. Thus, it is not surprising that part of the impetus behind the advent of the CIO is environmental in nature. To be specific, the following three environmental factors, (1) the technology revolution and the transition into the Information Era, (2) the increasing
competitiveness and volatility of the business environment, and (3) the proliferation of
the information-based organizational structure all are in part responsible for the advent
of the CIO.

The pace of technological innovation is accelerating and there appears to be no
end in sight. Not only are existing technologies becoming faster, cheaper, and more
powerful, but a plethora of new and diverse technologies are continually being
introduced. As organizations attempt to sift through and assimilate these new
 technologies, they also struggle to convert an ever-mounting volume of data into
 usable information. The successful transition from the Data Processing (DP) Era to the
Information Era is quickly becoming a critical success factor for many organizations as
the following illustrates:

The sophistication, complexity, and rapid growth of the technology
 revolution in the Information Era are . . . validating the concept of . . . the
CIO position to manage [information] resources in more and more
companies.

A CIO's ability to manage the organization's transition into the Information Era, while
charting a path through choppy technological waters, will be critical to the survival of
many organizations in an increasingly competitive marketplace.

Throughout the 1960s, most companies relegated their IS function to the back
office and selected an individual with a technical background to manage it. As would
follow from such an arrangement, IS managers were, for the most part, unaware of
their company's information needs and developed systems that were less than ideal.
However, the business environment began to change in the mid-1970s. Companies
faced double-digit inflation, soaring energy costs, and a variety of shortages. As usual,
out of crisis sprang innovation. Suddenly, this back-room function became the provider of a vital corporate asset, information. Although companies today do not have to deal with high inflation rates and energy costs, the economy of the 1980s provides its own challenges (e.g., corporate takeovers, global competition). The volatility of the 1980s demands continued quick response, since the average enterprise no longer knows who its future competitors will be, next month’s exchange rate or what new use of technology is about to make obsolete half of its product line and/or distribution system. Technology is the supreme wild card.²

If technology will be the "supreme wild card" for business, the CIO will be the holder of that card. In an increasingly competitive and volatile business environment, the CIO will be charged with providing companies the information necessary to make decisions and react quickly in the face of uncertainty.

The growing use and acceptance of IS technology within organizations is enabling a structural change that is having an impact on the environment in general. This change is in the form of a new organizational framework. "[T]he ‘organization of the future’ is rapidly becoming reality -- a structure in which information serves as the axis and as the central structural support."³ This "organization of the future" is flatter and more reliant on the efficient flow of information in all directions (e.g., upward, downward, external) than the traditional hierarchy. The proliferation of this structural change is resulting in environmental changes as organizations find their suppliers, customers, and competitors taking on new forms and methods of operation. "The information-based system . . . closely resembles the symphony orchestra. All instruments play the same score. But each plays a different part. They play together,
but rarely in unison." The integration needs of the information-based organization will be met by appointing a new senior executive, the CIO, as "conductor" of the technology infrastructure on which it depends.

The technology revolution, transition to the Information Era, unprecedented volatility of the business environment, and proliferation of the information-based organizational structure have all contributed to the advent of the CIO function. These environmental factors in turn precipitated circumstances that have also contributed to the establishment of the CIO. Said circumstances can be categorized as strategic and organizational.

Strategic - The strategic consequences of the aforementioned environmental conditions are twofold. One, information is being recognized as a strategic weapon. Two, organizations are becoming increasingly dependent upon information as an input to the strategic planning process.

As a result of the mind-set of the Information Era, volatility of the business environment, and the proliferation of technology, organizations are regarding information as a strategic weapon and are looking to the CIO to lead efforts to create opportunities for that weapon in the marketplace. "Today's information technologies, coupled with advances in data communications, have made information systems a weapon to be considered in the fight for competitive advantage." As would be expected, those organizations to first embrace IS as a strategic weapon were competing in information-intensive industries (e.g., banking, insurance). "It's no coincidence that corporations with powerful CIOs are the ones that rise and fall on the quality of their information-processing systems." In a survey conducted by Business
Week and United Research Company, 70% of CEOs polled said that they are looking
toward IS to provide them with a competitive advantage. But, only 39% felt that IS
was adequately fulfilling that responsibility. The reason cited by CEOs for the gap
between expectations and performance was a lack of concentration on urgent business
needs by IS personnel. The CIO’s job is to bridge the gap between IS and senior
management and to ensure that technology is being strategically applied in order to
meet the organization’s needs.

Related to the acceptance of information as a strategic weapon, but on a
different tack, is the increasing dependence upon information as an input to the
strategic planning process. "Because information is a necessary and important
ingredient in corporate and business planning, . . . the CIO will necessarily be involved
in [this activity along] with senior managers throughout the firm." The prevalence of
the CIO, and the CIO’s role as a member of the business planning staff, will increase
as organizations become more dependent upon information as an input to planning
processes.

The same environmental factors that precipitated the aforementioned strategic
issues, also are responsible for a set of organizational issues, the third contributing
category to the advent of the CIO.

Organizational - A set of five key factors comprise this third contributing category to
the establishment of the CIO. The five factors are: (1) organizations’ quest to digest
investments in information technology and to manage this technology more effectively,
(2) the gap that exists between IS specialists and senior business managers, (3) the
amalgam of corporate culture and the CEO’s view of IS, (4) the decentralization of the
large as those within the budget itself. With an increase in the decentralization of IS comes an increase in the need for coordination of dispersed technologies and applications. "As information resources continue to decentralize, the CIO trend will continue to accelerate. This is because CIOs are needed most in decentralized companies where coordination needs are greatest."\(^{16}\) The findings of a Diebold survey add credence to this point. The survey revealed that there are more CIOs in companies that have decentralized IS operations than there are in companies whose IS functions are centralized.\(^{17}\) Even in companies with highly-centralized IS functions, the growth in the use of micros and minis is resulting in a de facto decentralization of the information resource.

Thanks to the proliferation of end-user computing, information processing is no longer limited to the MIS department. Because computer-processed and stored information is now available to staff and management throughout a corporation, the person responsible for planning, coordinating, and controlling the use of this vital resource must have organizationwide perspective and visibility. For an increasing number of companies, that person is the chief information officer.\(^{18}\)

As the decentralization of IS and the growth of end-user computing continue, the establishment of the CIO position will be necessary in order to address the planning and coordination issues raised by these changes.

Now that decentralization and end-user computing are becoming a fact of life, the issues of coordination, integration, and standardization are of critical importance. Although users may have responsibility for, and control of, IS resources in a decentralized environment; corporate-wide standards and policies with regard to IS are necessary in order to reduce redundancy and ensure compatibility and connectivity. "Only recently has technology made it possible for corporations to integrate all of their
Figure 1.

CIO Contingency Model

- Technology Revolution/Information Era
- Volatility of Business Environment
- Information-Based Organizational Structure

Degree of Impact

Degree of Prevalence

Degree of Utilization

- Use of Information as a Strategic Weapon
- Information as an Input to Strategic Planning Process
their hierarchies. Looking beyond the title, the challenge was to develop a uniform classification system that would adequately discriminate between those organizations that had embraced the CIO concept and those that had not. To address this issue, a matrix was developed that would classify an IS executive based upon his/her responsibility for technology and reporting level within the organization. This matrix is presented in Figure 2. Those individuals falling within the upper left hand quadrant of the matrix (i.e., broad responsibility for technology and high reporting level) were considered to be fulfilling the role of CIO within their organizations. Those falling within the upper right hand quadrant (i.e., broad responsibility for technology and low reporting level) were considered to be emerging CIOs. Half of the fourteen executives surveyed fell within the CIO quadrant and half within the emerging CIO quadrant. The relative similarity of the functions performed by those surveyed should be kept in mind when discriminating between the results obtained from the two groups. To explain the remaining two quadrants, an individual with both a narrow responsibility for technology and a low reporting level would be considered a DP manager. The remaining quadrant would be applicable to a start-up business in which managers at all levels have easy access to top executives.

After receiving and categorizing the surveys, each was read with the intent of either validating or invalidating the factors contained in the model. The questions on the survey were general in nature as not to lead the respondents toward a particular answer (e.g., If you explicitly ask any IS executive if information is important to the organization, the response will be yes.). The environmental factors are intuitively obvious and represent conditions to which all organizations are subject. Therefore, no
Technology/Reporting Level Matrix

RESPONSIBILITY FOR TECHNOLOGY

Information Technology (Broad)

START-UP BUSINESS

CIO

EMERGING CIO

DATA PROCESSING (Narrow)

Low (Finance)

REPORTING LEVEL WITHIN ORGANIZATION

High (CEO/President)
attempt was made to validate them through the survey. Although the sample contained only CIOs and emerging CIOs, the survey results contained surprising contrast. A summary of the positive responses is presented in Table 1.

The survey illustrates that information is generally of greater strategic importance to those organizations that have a CIO as opposed to those that do not. Both types of organizations place essentially the same importance on information as a strategic weapon. But, organizations with CIOs cited information as being a key input to their strategic planning process three times more often as those organizations without a CIO. A correlation between the utilization of the strategic factors contained in the model and the presence of a CIO within an organization seems to exist.

With regard to the five organizational elements of the model, all are more prevalent, some to a greater degree than others, in the CIO as opposed to the non-CIO organizations. The CIO organizations are clearly more concerned with the effective management of technology than are the non-CIO organizations. Although less striking in magnitude, a gap between IS and senior managers is more prevalent in the CIO organizations. Corporate culture, and the CEO's viewpoint, is markedly more favorable toward IS in the CIO as opposed to non-CIO organizations. In both types of organizations, end-user computing is proliferating, with the CIO organizations having a slightly higher incidence of proliferation. Also, a decentralized IS organization is more common among CIO than non-CIO organizations (n.b., A decentralized IS organization is the only factor surveyed which less than 50% of those organizations with CIOs had in common.). Lastly, organizations with CIOs seem more concerned with establishing common IS standards and architecture than those without. Overall, the prevalence of
Table 1: Survey Responses

Strategic

1. Is IS considered a strategic weapon?
   
   CIO  100%  NON-CIO  86%

2. Is IS a key input to the strategic planning process?
   
   CIO  100%  NON-CIO  29%

Organizational

1. Is company concerned with managing technology more effectively?
   
   CIO  100%  NON-CIO  14%

2. Is there a gap between IS and senior managers?
   
   CIO  72%  NON-CIO  57%

3. a. Is corporate culture favorable toward IS?
    
   CIO  86%  NON-CIO  29%

   b. Is the CEO favorable toward IS?

   CIO  57%  NON-CIO  29%

4. a. Is end-user computing proliferating?
    
   CIO  100%  NON-CIO  86%

   b. Is IS decentralized?

   CIO  43%  NON-CIO  14%

5. Does the company recognize a need for a common IS architecture and standards?
   
   CIO  57%  NON-CIO  14%
the five organizational elements in the contingency model is greater in organizations that have a CIO than those that do not.

The ten elements of the contingency model represent a consensus of the authors and researchers in the field. A survey of practitioners, both CIOs and non-CIOs, generally validates the opinions in the literature. With regard to the environmental elements in the model, although they have not received validation through the survey, their presence is apparent and their validity seems intuitively obvious. The model presented in Figure 1 provides a valid contingency-based approach to assessing the reasons why the CIO exists and why an organization chooses to establish the position.

Conclusion

The correlation between the opinions and ideas espoused in the literature and the real-world experiences of IS executives forms a contingency model that explains why the CIO exists and also assesses whether an organization can benefit from the establishment of the CIO function. The degree to which the model’s environmental factors impact the organization, its strategic factors are utilized by the organization, and its organizational factors are prevalent within the organization combine to determine the need for a CIO. In today’s business environment marked by increased volatility, competition, and dependence upon information, the management and application of an organization’s technology cannot be left to chance. The strategic utilization of technology must be a priority in all types and sizes of organizations. The establishment of the CIO function is a recognition of, and a step toward pursuing, that priority.
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