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CIO Roles and Responsibilities: Twenty-Five Years of Evolution and Change

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ABSTRACT

The IS research community has investigated the evolving and changing role of the Chief Information Officer (CIO) for more than twenty-five years. This research sought to better understand the recent changes of the CIO role. Our research goals were threefold: 1) To identify whether the CIO's job has changed from the characteristics suggested by previous studies; 2) to identify a profile of the attributes of CIOs, and 3) to understand what these developments suggest for the education and professional development of CIOs. We found that much of CIO role has evolved to the executive-level management and is centered on working with other business executives inside and outside of the firm to change the firm's strategy and processes. CIOs are now seen as multi-dimensional C-level executives who need to be experienced with many functions within the organization and possess a diverse set of skills needed to influence the organization.

Keywords

Information Systems, Chief Information Officer, Executive Responsibilities, Business Process Reengineering.

INTRODUCTION

The IS academic community has had an enduring interest in the roles and responsibilities of the senior IS executive. Over 25 years ago, Ives and Olson (1981) examined the evolution and nature of the IS manager's job, and concluded that the IS manager's role is "one of coordinator, motivator, and planner." About a decade later, Earl and Feeny (1994) suggested that Chief Information Officers (CIOs) provided value by focusing on business imperatives, interpreting external information technology (IT) success stories, managing IS executive relationships, communicating IT value, managing IS development, and building a vision for the role of IT. Later, Feeny and Willcocks (1998) identified nine core IS capabilities for exploiting IT that fell within the three domains of business and IT visioning, design of IT architecture, and delivery of IT services.

However, over the past five years, a number of developments have converged that impact the traditional roles and responsibilities of the CIO:

1. Business executives are assuming a more pro-active role in the management of IT resources and services, taking over many of the responsibilities previously allocated to IT executives. In firms where IT has become deeply woven into business processes and operations, Chief Operations Officers (and other C-level executives) have begun to assume responsibility for the strategic thinking around IT deployment and use.
2. A new executive role of "*Chief Technology Officer*" has emerged, which has assumed some of the earlier architecture and infrastructure responsibilities of the CIO.
3. The introduction of new regulations, such as the Sarbanes-Oxley and Health Insurance Portability and Accountability Act of 1996 (HIPPA), have forced firms to engage in significant governance and compliance activities around their IT resources and activities.
4. There is a significant growth in the adoption of IT outsourcing. At the extreme, entire IT organizations are being transferred to external services providers. Three variants of traditional IT outsourcing are currently receiving much attention: utility computing, business process outsourcing, and offshore outsourcing. Together, these developments create the potential for significant impacts on the breadth and nature of the activities which traditionally fell within the CIO's domain.
5. Many organizations are now inclined to buy rather than build IT applications. Developing systems on time, to specification, and within budget was traditionally one of the primary management responsibilities of CIOs.

Against this background, it has been proposed that the roles, responsibilities and work behaviors of successful CIOs are changing significantly. Evidence of this trend has been building in the literature for some time. For example, Rockart (1988) argued that line managers should take the leadership in managing IT initiatives and resources. Marucal (2000) discussed whether CIOs had become obsolete. Ross and Weill (2002) proposed six IT decisions that IT people should not make, and a recent CIO Magazine article suggests a dilution of the CIO role (Overby, 2003).

Inspired by these developments, we decided to further investigate the ongoing evolution of the CIO's roles and responsibilities have changed and evolved. The goals of this research were threefold: 1) To identify whether the nature of the CIO's job has changed from the criteria and characteristics suggested by previous studies; 2) to identify a profile of the attributes of CIOs who have successfully adjusted to the scenarios identified in 1-5 above, and 3) to understand what these developments suggest for the education and professional development of CIOs.

LITERATURE REVIEW

Over the last 25 years, the title of the senior IS executive has changed from DP Manager, to MIS Manager/VP, to CIO as the underlying roles and responsibilities of the senior IS executive have changed. These changes emerged because competitive and technological factors, both internal and external to the firm, have forced companies to rethink how they use their firm's IT resources to better compete. Internal to the firm, companies have more heavily integrated its technical resources with its business operations to develop capabilities and to establish competitive advantages. External to the firm, new competitive norms and industry regulations (e.g., Sarbanes-Oxley) have also forced executives to use and rely on the IS executive to use the company's IT resources to comply with and to drive strategic change within and outside the organization. Below, we provide a summary of the research that has been conducted on the CIO over the last 25 years and identify the key responsibilities that IS researchers have highlighted in their studies. We use these studies to characterize the important roles and responsibilities of the CIO over time.

The IS Manager's Role in the 1970's and 1980's. In a study on management information systems (MIS) executives, Wetherbe and Whitehead (1977), found that there was a strong distinction between MIS executives who were either in an operations or development functional role. They described operations as somewhat of a closed, stable, and mechanistic environment which required the use of formal policies and procedures. Development was described as a relatively open, adaptive, and organic environment, where the managers were required to be able to function within a flexible, decentralized decision making, and autonomous environment.

In the early 1980's, Ives and Olson (1981) described the IS manager's role as a technician, who was responsible for managing a relatively unimportant service function. In their foundational article, they noted,

> *"The information systems manager's role is depicted as one of coordinator, motivator, and planner with a cadre of experts, both internal and external, who provide technical expertise." (p. 49)*

Ives and Olson (1981) indicated that MIS managers tended to list their primary objectives and motivations as those related to measures of system efficiency, rather than effectiveness. Further, they indicated that these managers exhibited little need for social interaction than their other management counterparts in other parts of the organization. Similarly, Rockart (1982) found that one of the primary roles of the IS manager was to help the organization adapt to a changing technical environment, where the manager needs to assure that the "evolving technical opportunities are understood, planned for, and implemented" in the organization. He notes that there are four primary critical success factors for IS executives which include, 1) *Service,* the effectiveness and efficient performance and user perception of necessary technology operations, 2) *Communication,* understanding the world of key users and top line executives and have them understand the IS environment), 3) *IS Human Resources,* assisting executives in finding IS talent to develop and use information data bases, and 4) *Repositioning the IS Function,* managing the technical, organizational, psychological, and managerial aspects related to the firm's IS.

Hence, research conducted in the 1970's and 1980's generally reflects the senior IS executive as one who served the organization by acquiring and setting up the technical infrastructure to process and store information within the firm.

The CIO's Role in the 1990's. The title of the CIO was introduced in the mid 1980's to describe a new breed of IS executives that had been elevated to C-level positions within certain companies. These CIO's fought to gain credibility within the organization because they took on the task of running a function that took a lot of resources, but offered little measurable evidence of its value. In the early 1990's, corporate executives began to recognize the value of CIOs and IS executives, whereby their roles began to transform from a primarily technical manager, to that of a technical and organizational manager who was capable of using IT to add value to the firm.

In 1992, Applegate and Elam found that the characteristics of IS executives had undergone a fundamental change over the last decade, and were now focused on technology strategic planning and control, IT architecture management and standards development, and human resource management. In their study, they also found that an increasing number of these IS executives had begun to report directly to the Chief Executive Officer (CEO) and over half of them had become senior managers. These IS executives were valuable to the company as they brought a broad business perspective to the position and implemented development strategies within their organization that ensured that other IS professionals were able to excel to higher levels of management. However, soon after their rise in importance, these CIOs began to see noticeable struggles with their CEOs.

Earl and Feeney (1994) found that CIOs began to add value in key areas of the organization. In particular, they suggested six key areas where CIOs add value, 1) Obsessive and continuous focus on business imperatives, 2) Interpretation of external IT success stories, 3) Establishment and maintenance of IS executive relationships, 4) Establishment and communication of IS performance record, 5) Concentration of the IS development effort, and 6) Achievement of a shared and challenging vision of the role of IT. The role of the CIO was evolving to focus more on business imperatives where they invested their efforts into decisions that developed and tested their vision of the business.

During the 1990s, most of the studies on the CIO (e.g., Davenport, 1994; Rockart, Earl, and Ross, 1996; Ross and Feeney, 1999) argued that the primary issues influencing and shaping the CIO's role were from factors primarily *within* the firm. Only towards the end of this century did researchers begin to address the effects of *external* factors affecting the use and management of the firm's IS. Researchers argued that the firm's business functions became more heavily involved and dependent on IT from an operational and strategic role. For example, through interviews with sixty-one CIOs, Feeney and Willcocks (1998) identified nine core IS capabilities that executives possessed while exploit IT. These capabilities fell among three main domains of CIO responsibilities, which include 1) Business and IT vision, 2) Design of IT architecture, and 3) Delivery of IS (Figure 1). Within these three functions, the authors identified nine core IS capabilities of executives. *Leadership* deals with integrating IS efforts with the business purpose and activities. *Business systems thinking* encompass envisioning the business process that technology makes possible. *Relationship building* requires getting the businesses constructively engaged in IS issues. *Architecture planning* requires the creation of a blueprint for a technical platform that responds to current and future business plans. *Making technology work* relates to rapidly achieving technical progress. *Informed buying* ensures that the IS executive manages the IS sourcing strategy that meets the interest of the business. *Contract facilitation* ensures the success of existing contacts of IS services. *Contract monitoring* ensures the protection of the business's contractual positions. *Vendor development* identifies the potential added value of IS service suppliers.

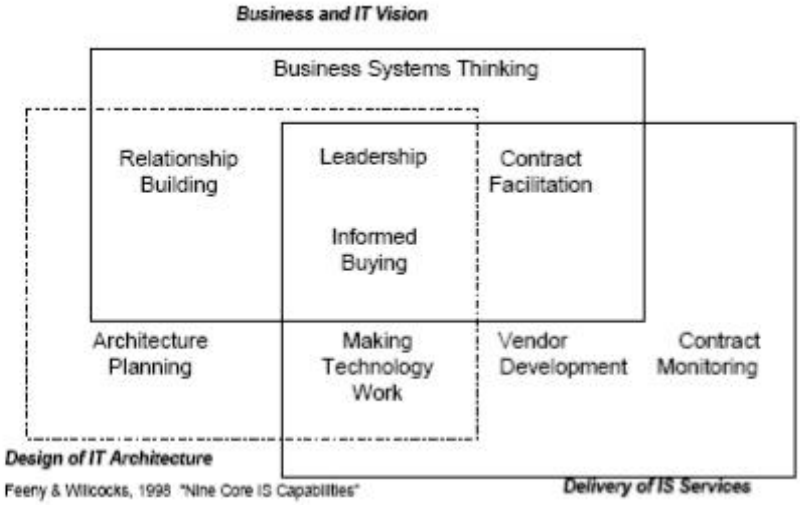

Figure 1: Feeny and Willcocks, 1998 "Nine Core IS Capabilities"

Additionally, Ross and Feeney (1999) conducted a longitudinal study on 10 leading CIOs and illustrated the credibility and status of the position over three stages of growth in the roles and responsibilities of the CIO, that reflect increased organizational learning over time (Figure 2). In the first stage, the CIO serves as a functional head with the responsibility to develop new systems on time and within budget, obtaining the ROI expected when the IT project was approved, and operating the portfolio of IT according to the agreed service and satisfaction levels. In the second stage, the CIO evolved to being capable of building a strategic partnership with its business units. Here, the key objective is to align the IT investments

and resources with the key strategic business priorities. In the third stage, the role of the CIOs matures and is seen as one of the key individuals who is capable of driving strategy through the use of IT. Here, the CIO is able to recognize emerging capabilities and applications of IT, argue their importance to the business units, and drive new business strategies through the organization.

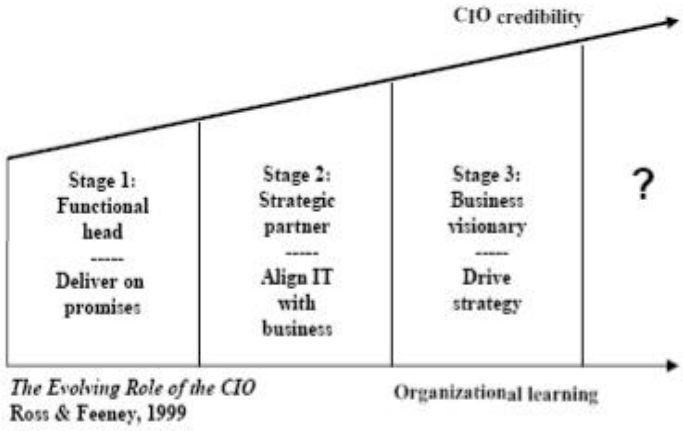

Figure 2: Ross and Feeney 1999, The Evolving Role of the CIO

Ross and Feeney suggested that additional research needed to be conducted on the stages that follow Stage 3. The authors suggest that factors such as the emerging Web-based era, IT outsourcing decisions, and IT governance initiatives influence the manner in which firms learn and the role that the CIO plays in aiding this process.

In summary, research conducted in the 1990's relating to the roles and responsibilities of the CIO reflects an ever increasing responsibility for organizational growth and the development of the CIO into the role of business strategist and visionary.

The CIO's Role in the 2000's. Over the past 5 years, researchers have argued that the role of the CIO had evolved to one responsible for weaving the IT infrastructure and capabilities into the fabric of business operations. Investigations have shown that the CIO's role has evolved into initiating and provoking businesses to change processes and strategies through the use of IS. Researchers have argued that corporations had experienced an even more significant evolution of the CIO's role, whereas these executives increasingly played a key, strategic, and forward-looking executive role for the organization. Key technology issues, such as spending and budget allocation (Leidner, Beatty and Mackay, 2003; Ross and Weill, 2002), IT architecture and capabilities development (Kaarst-Brown, 2005; Sauer and Willcocks, 2002;), security (Ross and Weill, 2002), delivering value (Kohli and Devaraj, 2004; Maruca, 2000), relationship building (Agarwal and Sambamurthy, 2002) and governance (Holmes, 2006; Weill and Ross, 2004), became key responsibilities of the CIO for the new millennium.

A gap in the recent literature on what role the CIO plays on these technology issues suggests a need to investigate the developing and evolving role of the CIO. Hence, this juncture marks the point of departure for this research.

RESEARCH APPROACH

Consistent with the focus on understanding how the role of the CIO has changed and evolved over time, the research was designed as an exploratory, multiple case study (Yin, 1994). This research design enabled the researchers to explore the phenomenon in a natural setting and to engage in theory-building in an area where there has been relatively little prior research and theory formulation (Miles and Huberman, 1984).

The strategy for data collection is described as triangulated because it involved multiple methods for collecting data and helped deal with problems of establishing construct validity and reliability (Yin, 1994). The data was collected over a 16-month time period and in two phases. In the first phase of the data collection, we collected and reviewed secondary data sources, such as CIO job postings and both academic and practitioner-oriented journal articles on the roles and responsibilities of the CIO. Drawing from the secondary data, the researchers documented the general categories, responsibilities, and roles of the CIO.

Job Postings. We collected job listings for CIO positions from various sources such as CIO Magazine, InformationWeek, and a few other publicly available sources of information. To ensure that we captured a diverse set of job responsibilities and characteristics, we collected job listings from numerous industries, including (but not limited to) education, high-technology

firms, multi-national distribution firms, to healthcare companies. After reviewing the job listings, we coded the qualifications, attributes, skills, duties, knowledge, abilities and responsibilities from the job postings.

Literature search. We reviewed articles related to the CIO roles in academic and practitioner-oriented journals, and identified the key roles and responsibilities of the senior IS executive over time. We then categorized this data to develop a generalized framework for the evolution of the CIO role over time. This framework was used to develop an interview protocol.

CIO Interviews. In the second phase of data collection, semi-structured interviews were conducted with 10 CIOs drawn from diverse businesses. Based on a convenience sample, interviewees holding the title of "CIO" were selected. The firms and industries represented within the sample are described in Table 1. The interview format was semi-structured and used open-ended questions (See Attachment #1). The interview questions were derived from the coded qualifications, attributes, skills, duties, knowledge, abilities and responsibilities from the job postings and research literature listed above. The interview phase provided primary data on CIO perspectives and interpretations of their current roles and responsibilities, and of CIOs perspectives on the critical attributes currently required to be successful in these roles. The interviews were tape recorded and transcribed. A database was generated to organize and document the data collected from the field interviews and secondary data research (Strauss and Corbin, 1990; Yin, 1994; Coffey and Atkinson, 1996; Kirk and Miller, 1986).

In analyzing the research data, we matched the coded data among the three data sets (CIO job postings, literature, and interview data) to identify common threads of CIO roles and responsibilities, and develop an understanding of the changing and evolving role of the CIO. Through pattern matching activities across multiple sources of data, we were also able to identify qualifications or gaps in the responsibilities that were inconsistent among the three data sets. Patterns identified in the data were compared with patterns that would be predicted by the extant literature. For the patterns that coincided, the results helped to strengthen the internal validity of the case study. For the alternate patterns that did not coincide with theory, the results helped to identify potential contributions to extend existing literature and understanding (Yin, 1994). This process of analysis helped us to expand and tease out the data in order to formulate new questions and levels of interpretation (Coffey and Atkinson, 1996).

RESULTS

A summary of the data on key CIO roles and responsibilities and critical CIO attributes that was collected across the ten CIO interviews is provided in Table 1 below.

Overall, our findings are consistent with the notion that the roles and responsibilities of the CIO continue to change and evolve as they have done over the past twenty-five years, as firms have continued to leverage and integrate new IT into the information and business processes of their firms. Our findings can be summarized into four key points explained below:

Finding #1*: CIOs are tasked with invigorating the firm's existing IT infrastructure and achieving a return on investment (ROI) on the company's previous IT investments.* The case data indicated that the role of the CIOs has changed over the last five to ten years because corporations have begun to experience significant budget cuts and were required to leverage existing investments in IT to find cost savings or to provide opportunities to generate additional revenues for the firm. The CIOs indicated that one of their primary motives to achieve this objective was to better integrate the organization through the use of existing IT. One CIO from a manufacturing firm indicated,

> *"IT was viewed as processing back office and data processing. Now, we've moved into information, we've moved into intelligence. In the early days, it was all based around efficiency. ... In today's environment (2005), it's using our IT investments to support the business - How do you increase revenues? How do you increase customer satisfaction? How do you increase lifetime owner loyalty? And, at the same time, you still need to focus on efficiencies."*

As a result, many of the CIOs that we interviewed shifted their focus from the supply side (i.e., purchasing, acquiring, or implementing) of technology management to the demand side (i.e., IT demand and creating value). In particular, CIOs indicated that they are no longer focusing on purchasing new technology. Instead, these CIOs concentrated on enhancing the company's existing IS architecture and utilizing existing technologies to provide better leverage and capabilities development for the businesses.

Table 1: Summary of Companies, CIO Responsibilities, and CIO Attributes

Company Description	Evolving CIO Responsibilities	Important CIO Attributes
Company A: National non-profit healthcare	• Delivering value • Investment analysis • Financial decision making • IT Governance • Compensation policies • Training policies • Change management • Legal • C-level manager influence	• Technical understanding • Project management • Ability to prioritize • Corporate leadership
Company B: Japanese multi-national automobile manufacturing	• Security • Business resumption • Adding business value • Strategic planning • Strategic processes	• Ethical • Builds relationships • Good communication skills
Company C: National Comic book & Toy production	• Strategic direction setting • Change agent • Technical leader • Business driver • IT architecture • Security • Governance • Regulations officer • HR staffing	• Vision for strategy & implementation • Ability to negotiate • Good communication • Influencer • Understand business operations
Company D: Digital content entertainment	• Systems management • Customer management • Operations management • Supply chain optimization • Process improvement • Budgeting • Community service • Networking • Policy integration	• Prioritization • Mentoring / coaching • Negotiation • Ability to manage relationships
Company E: Entertainment digital content provider	• Business manager • Technology enabler • IT purchasing & architect • Process engineering • Change culture • Supply chain improvement • Security • Develops strategy • Corporate structuring • HR sourcing	• Analytical • Able to influence • Accountable • Financial knowledge • Capable of negotiations

Company F: Aerospace research firm	• Networking infrastructure • Negotiator • Contract manager • Regulations enforcer • Governance • IT architecture • Security • Policy implementation • IT representation	• Relationship building • Strategic influencer • Problem solver • Morale builder • Strategy developer
Company G: Private University	• Security • Technical liaison • Education • Core decision maker • Process improvement • Information dissemination • Standardization • Forecasting IT / budget • Policy / governance • Budgeting	• Network relationships • Good communication • Integrated in the business • Collaborator
Company H: Business Intelligence Firm	• Project manager • IT architecture manager • Strategic planning • International governance • Process improvement • IT & HR sourcing • Compensation planning • IT evolution • Budgeting	• Complex problem solver • Business transformation • Analytical • Relationship building
Company I: National Semiconductor Manufacturing	• Computing & networking • Bus. Process reengineering & improvement • Supply chain management • IT security • IT investment gatekeeper • Project Management • Business Value	• Ability to educate • Capable of making empowered decisions • Strategic vision
Company J: Insurance Agency	• IT governance • Budgeting • Purchasing • Financial review • Goals planning • Business engagement	• Ability to manage relationships • Strategic planner • Ability to prioritize • Strong communications • Motivator

Finding #2: *CIOs are commissioned by the Chief Executive Officers (CEO) to work with the business to control and reduce internal operating costs.* Leading the perception of the changing role of the CIO was the realization that this corporate executive served as the bridge between both the technology and business sides of the organization. Consistent across all field interviews conducted, we found that the CEOs commissioned the CIOs to partner, build, and sustain relationships with key business executives in hopes of controlling and reducing internal operating costs. Also included in this relationship building is the education of their business counterparts on IT. A CIO from a Japanese automobile manufacturing firm indicated,

> *"One of the major roles of the CIO is relationship building, relationship maintenance, both internal in the organization and external to the organization. ... without those people skills, I don't know how any one would survive. ... The CIO's role is to understand the business ... understand enough about technology that's how you might be able to manage that to help the business, because you don't understand the challenges that the business faces - the opportunities. ... You also need to know enough about [the business] to come forward with some recommendations to provide value and to improve operations."*

Further, two of the CIOs indicated that in order to reduce internal costs for their IT operations, their firms outsourced non-core IT functions to outside firms. Outsourcing allowed the company to better focus their organization on initiatives that were of more priority, core, and strategic.

Finding #3: *CIOs are tasked to enable business agility and to facilitate the delivery of new business value in the short term through innovative IT investments.* Competition among businesses has sped up due to the rapid implementation and use of information technology. New technology, such as Web based applications and outsourced IT and business process outsourcing have provided significant opportunities and advantages for corporations and have sped up the time that firms have to respond with their own threats or strategies. The case data indicated that CIOs became responsible for leading new IT-enabled strategies and decisions which enabled the business to better compete in short-term strategies. Another CIO indicated,

> *"The organization must be positioned to respond rapidly, because the windows of opportunity are very short [due to the speed of technology development]."*

The field data also indicated that one of the objectives of the CIO was to drive bold changes across multiple business functions within and outside the corporation. CIOs indicated that they attempted to do this through infrastructure standardization and simplification, radical process improvements, major changes in IT workforce culture, and IT governance policies and procedures. A CIO from the Nation's leading non-profit health-care provider indicated,

> *"We have the strategy. We have the talent on board now. We have the right organization structure. We have the right funding. We have the right governance processes, who's to select which projects need to live, which ones need to die. Now, we've gotta be able to quickly and accurately execute."*

Finding #4: *CIOs are tasked with better managing corporate risks, such as developing and implementing protective internal and external security measures, ensuring compliance with industry regulations, and enforcing IT governance initiatives.* Our interviewees told us that security threats within and outside the organization forced their divisions to re-think how technology is used. Included with these initiatives affecting the internal operations of the firm is the further education and implementation of IT governance policies and procedures to ensure proper and appropriate use of technology within the organization. Further, these initiatives were also spun from external factors to the organization, such as adherence to Sarbanes-Oxley or HIPPA regulations. Both internally- and externally-inspired actions further brought the IT and its function to the spotlight and forced firms to change how technology was being used to track information and processes within the organization. CIOs have gained more respect within and outside the organization, due to the external market regulations and constraints that have forced change internal to the firm. The Japanese Automobile manufacturer CIO explained,

> *"Over the last five years, [one of] the biggest change is the rapid change in technology [web-based applications, Internet, wireless] ... you need to pick and choose those [technologies] that have an advantage for your company without putting the company at risk [security]."*

Taken together, four of the ten CIOs interviewed for this study indicated that technical responsibilities continued to be a large portion of their responsibilities.

However, six of the ten CIOs indicated that their roles went above and beyond managing the IT infrastructure and IS services of the firm. These CIOs were primarily concerned with leveraging the firm's existing IT infrastructure to build additional business and organizational competencies and capabilities across multiple units within and outside of the organization. These CIOs indicated that their roles were more strategic and innovative in nature. A CIO from an entertainment company commented,

> *"I sit on the executive management committee, so therefore I am part of and privy to the strategy of the organization. ... I manage the strategies and the issues that the corporation wrestles with. ... I have under me a business process group. And their mission in life is really to understand what the business is, and what the processes they have support the business, what are the efficiencies, inefficiencies... or opportunities in that process to improve [our business]."*

With respect to the nine core IS capabilities proposed by Feeny and Willcocks (1998), our interview data provided strong support for three of the nine capabilities, specifically relationship building, business systems thinking, and leadership (Figure 3). The data also revealed some support for two of the nine capabilities, namely informed buying and contract facilitation. Finally, our case data indicated weak support for four of the nine IS capabilities, architecture planning, making technology work, vendor development, and contract monitoring.

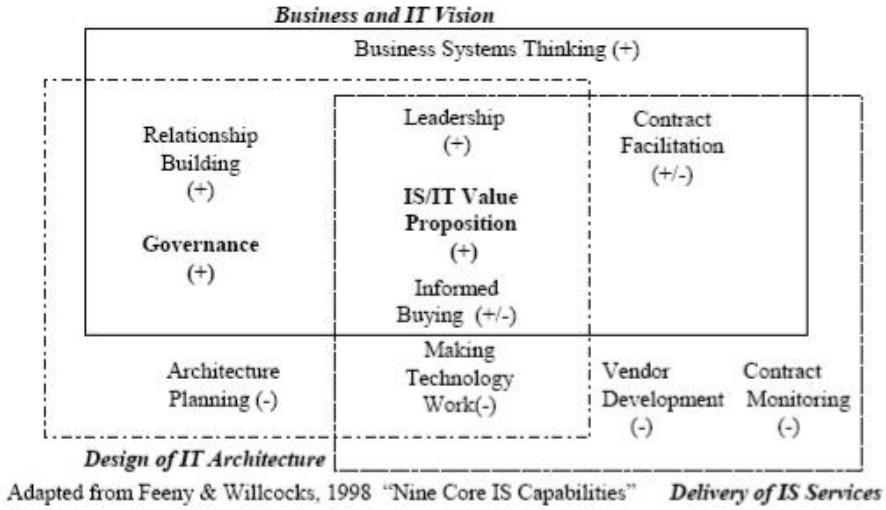

Figure 3: Empirical support for Feeny and Willcocks 1998

Further, our findings indicated that a total of eleven core IS capabilities existed within the framework of our analysis. In addition to the original nine capabilities identified within Feeney and Willcox's framework (1998), we identified two additional and prevalent IS capabilities: "IS/IT Value Proposition" and "Governance." *IS/IT value proposition* is defined as the utilization of IS to facilitate business agility and to deliver new business value in the short term through innovative IT investments. *Governance* is defined as the decision rights and accountability framework for encouraging desirable behavior in the use of IT. Taken together, the data indicated that for some CIO's, the focus continues to evolve towards greater involvement with business strategy and process innovation rather than on the design of IT architecture and delivery of IS services. Our observation is that there appears to be a bifurcation of the CIO role between two roles (Figure 4). For the purposes of this research, we have termed these two roles the *Chief Innovation Officer* and the *Director of IT*. The Chief Innovation Officer role assumes responsibility for leveraging IT resources to introduce and support process and product innovations across multiple units within and outside the organization. Since Chief Innovation Officers are responsible for contributing to and perhaps even shaping the strategic vision of the company, these individuals assume true C-level executive status. In contrast, those assuming the "Director of IT" role oftentimes should report to the CIO and focus on delivering reliable and cost efficient IS services. Because of this individuals focus on cost containment, the position typically reports to the Chief Financial Officer. Our data generally indicates that in firms where technology is not a core product of the firm (i.e., car manufacturer, toy producer), the CIOs tend to be associated with the Chief Innovation Officer role. Contrasted, in firms where technology is the primary product or resource of competitive advantage (i.e., digital content provider, business intelligence firm), the CIOs tend to have been given responsibilities more in line with the Director of IT role.

Figure 4: Bifurcation of the CIO role

In summary, the key findings of our study on the changing and evolving role of the CIO can be summarized by a quote taken from one of our interviewees,

> *"[Our organization] had to un-learn what we learned in order to successfully use technology to aid in the management and control of information and to enhance knowledge exchange. ... We realized how much faith [the company] had to put into IT and its employees."*

Much of the roles and responsibilities of CIOs in today's organizations are centered around educating and persuading the organization to better understand and leverage IT resources. These efforts are often surrounded and constrained by many years of culture and socially-embedded approaches to how technology is used within the organization. The findings of our research indicate that the constantly evolving role of the CIO has evolved into a much more than just a strategic and visionary thinker. Additionally, the role encompasses the transformation of multiple business functions within and outside the firm, as well as enforcing structure and governance among the company's business processes.

The CIOs indicated that their top six challenges include, 1) Identifying, promoting and managing IT-enabled business agility, 2) Innovating and integrating the enterprise, 3) Communicating the impact of business decisions on IT costs, 4) Prioritizing & negotiating IT-enabled business initiatives. 5) Moving beyond managing the IT utility (supply perspective) to managing IT demand and value creation, and 6) Demonstrating IT business value while maintaining IT goodwill among corporate executives. CIO responsibilities absent from the Feeney and Willcocks (1998) core IS capabilities were managing IT security, IT education, IT Governance, and IT-enabled process and supply chain transformations.

Finally, the CIOs in our sample identified five significant attributes required of today's CIOs. These include, 1) Competencies in contributing to and leading corporate strategy, 2) Competencies in business process innovation and design; able to anticipate business needs, 3) Expertise in managing and demonstrating IT costs and impacts, 4) Effectiveness in publicizing and raising IT's profile and position within the company, and 5) Strong communication, negotiation, and facilitation skills.

DISCUSSION & CONCLUSIONS

Researchers investigating the role of IS executives have found that it has evolved and changed over the last twenty-five years (Ives and Olson, 1981; Earl and Feeney, 1994; Leidner, et al., 2003). Our study extends this body of research and provides evidence into the new millennium. From the data we gathered from our interviews, CIOs described their earlier roles to be "the behind the scenes geeks with pocket protectors" before the 1980's. Then in the 1990's, the perception of these CIO's changed to be seen as "skateboarders with neon colored hair." And, following this in the late 1990's and early 2000's, these CIO were viewed as key individuals responsible for managing and leveraging technologies within the firm's silos to provide value to the business. We found that much of the role of the CIO has evolved to the executive-level management and is centered on working with other business executives inside and outside of the firm to change the firm's strategy and processes. CIOs are now seen as multi-dimensional C-level executives who need to be experienced with many functions within the organization (such as finance, organizational behavior, operations management, process reengineering) and possess a diverse set of skills needed to influence the organization.

The findings of this research study are significant, as it provides the IS research community with a better understanding of developments to consider for the future research, education, and professional development of CIOs. The study also contributes to practice by providing key roles and responsibilities which CIOs can address as they manage and develop their IS infrastructures. Although the findings of this research are limited by our small sample size, the study sheds some important insights on the constantly evolving roles, responsibilities and attributes of today's CIOs. Our next steps for future research are to extend our data collection to additional CIOs in corporations of varying sizes and industries, and to cross reference CIO's perceptions of their roles and responsibilities with the perceptions of other C-level executives.

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Attachment #1: CIO Interview Protocol.

Section 1: Introduction

We are conducting this research to develop an understanding of how the role of the CIO has changed over the last 5 years. Fundamentally, we are interested in finding out "What do CIOs do?

I will be asking you questions concerning:

1. *Your background and experience*
2. *Your roles, responsibilities, and work activities as CIO within your organization*
3. *Your perception of how the role of the CIO has changed over the past 5 years*
4. *Your perception of how the CIO role will evolve over the coming 5 years*

Section 2: Background details on key informant and firm's IT resources

First, let me ask you some questions related to your background

1. *Name*
2. *Exact full title within the firm*
3. *Position within the organizational hierarchy*
   a. *Prompt: ask for copy of organizational chart*
4. *Length of service with the company and industry*
5. *Educational background*
6. *Nature of prior professional experience*
   a. *Career progression*
   b. *Previous professional positions/roles*
   c. *Firms/industry/company*

Section 3: CIO perceptions on the changing roles and responsibilities questions

The next set of questions is designed to help us understand your perception of the role of the CIO.

7. *How do you see/ would you describe your role as CIO?*
8. *What are your key responsibilities as CIO?*

- *Ask for copy of official job description*

9. *What do you actually do, i.e. how do you spend your time?*

   Describe a typical day/week/month:
   Tasks and activities; amount/proportion of time spent on each
   People, key work-related social network, purpose of interactions

   If I was to shadow you (follow you around) for a week/month, are these the tasks/activities that I would see you doing? Are there other activities that we have not covered?

   *(**Prompt: Would you be willing to provide access to your diary/calendar for the past month for verification?)*

10. *If you could, would you change anything about how you spend your time as CIO?*

    If yes, ask for re-allocation of time between tasks and activities identified above
    Identify any additional tasks not mentioned above

11. *What are YOUR key challenges right now?*
    How do you deal with/ "do" each of these? (Be sure to remind CIO of each challenge)
12. *Let me ask you a related but different question:*
    What are the key challenges for managing IT at your firm?
    How do you deal with/ "do" these?

    (Key areas will likely include:
    Strategic planning for IT;
    IT budgeting and resource allocation;

IT portfolio management (infrastructure vs. applications);
IT sourcing and acquisition;
IT performance and impact evaluation;
Technological change;
Planning for future business scenarios;

13. *What IT-related decisions and responsibilities do you feel that you are NOT responsible for?*
14. *Do other C-level executives play a role in the management of IT resources and services within your firm?*
    COO; CTO; CSO; CEO, Others?
    If so, what roles do they play?
15. *Do you consider yourself to be **actively engaged** in the running of this business at a strategic and operational level?*
    If so, how?
    formal mechanisms: memberships of committees; participation in key activities;
    informal mechanisms: engagement and influence with business executives/business units
16. *How do **you** provide value to your firm?*
17. *What motivates and excites you most about your role as CIO?*
    (what gets you out of bed in the morning?)
18. *How is your performance **assessed** and **rewarded**?*
19. *Apart from salary, does the firm provide any performance-related incentives?*
20. *From your perspective, has the role of the CIO changed over the past 5 years?*
    If so, in what ways? Why?
    If not, given all the changes in IT, why not?
    (Prompt for a reflection on the CIO's personal experience AND reflection upon the CIO profession in general)
21. *What are the key **personal attributes** and **professional background** required to be a successful CIO today?*
22. *Do you think that the role of the CIO will change over the next 5 years?*
    If so:
    In what ways? Why?
    What will be the key the attributes of successful CIOs in 5 years?
    Implications for education and professional preparation?

Section 4: Additional details on the firm IT resources and context

23. *Extent and nature of IT resources and capabilities at your firm*
    in-house versus outsourced
    centralized vs. decentralized vs. distributed
24. *Philosophy/emphasis on the management of IT*
    cost minimization vs. important agent of business innovation
25. *Heritage/history of IT capabilities and competencies at your firm*
26. *Firm context:*
    Industry,
    firm size,
    give a brief description of you firm's business strategy
    global reach: how many countries?
27. *Level and basis of competition in your industry;*
    strategic position (leader versus follower);
    velocity (pace of competitive change: slow vs fast)
    need for strategic agility (high vs low)
28. *Information intensity; Strategic and operational dependency on IT; "Organizational respect" for IT;IT sourcing strategy (build/buy); IT organization structure (organization chart for IT); IT governance mechanisms; IT competency of business execs;*