

## **Preparing to be the Chief Information Officer**

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*Chief Information Officers (CIOs) are increasingly being recognized as crucial enterprise leaders. The CIO must exhibit the same types of business knowledge and skills that other senior level executives are expected to exhibit. At the same time the CIO must understand information systems and information technology and must have a vision for how those systems and that technology can add value to the organization. This paper reviews the roles the CIO must fulfill and examines some ways individuals are preparing to fulfill those roles through academic preparation and career experiences.*

### **INTRODUCTION**

An organization's Chief Information Officer(CIO) is responsible for overseeing all aspects of the organization's information resources and ensuring that those resources effectively support achievement of the organization's mission. CIOs are increasingly recognized as crucial enterprise leaders and the CIO position is no longer, if it ever was, a position for the technical person whose communication includes liberal doses of the acronyms that are so commonly part of the information technology area. Rather, the CIO must exhibit the same types of business knowledge and skills that other senior level executives are expected to exhibit. At the same time the CIO must understand information systems and information technology and have a vision for how the information systems and technology add value to the organization. This paper reviews the roles and changing expectations for the CIO. The paper also examines the impact that changing expectations have on CIO education and career preparation.

### **THE ROLE OF THE CIO**

In a study of CIO effectiveness in the healthcare industry Smaltz, Sambamurthy, and Agarwal found six prominent roles for the CIO. Those roles are: "business strategist, integrator, relationship architect, utility provider, information steward, and educator." (Smaltz, Sambamurthy, and Agarwal, 2006) The utility provider and information steward roles relate to the classic information technology(IT) responsibilities of providing computing services and providing appropriate access to and protection for information resources. The business strategist, integrator, relationship architect, and educator roles are focused less on the technology and more on the business and the effective utilization of information technology. These roles are growing in importance in many organizations. Weiss and Anderson interviewed 8 CIOs, 11 VPs of IT, and 75 IT staff members from several different Fortune 500 companies (Weiss and Anderson, 2004). They concluded that the work of IT leaders has become more strategic and enterprise focused rather than maintenance and functional area focused. Polansky, Inugani, and Wiggins (Polansky, Inugani, and Wiggins, 2004) interviewed CIOs in leading global organizations and concluded

that “the role of the CIO is moving from one of technical implementation to strategic planning and from reactive support of business needs to driving innovation and competitive advantage.” Sobol and Klein (Sobol and Klein, 2009) surveyed 92 U.S. CIOs and correlated their responses with firm financial data from the COMPUSTAT database. They concluded that a firm with a strategic rather than utilitarian orientation for IT tends to exhibit higher financial performance.

The business strategist, integrator, relationship architect, and educator roles are important for leaders in both IT and non IT areas within the organization. Smaltz, Sambamurthy, and Agarwal also found that “CIO capabilities, reflected in their business and strategic IT knowledge, interpersonal communication skills, and political savvy, had a significant positive relationship with CIO role effectiveness.” (Smaltz, Sambamurthy, and Agarwal, 2006) Business knowledge, interpersonal communication skills, and political savvy are important factors related to the success of any business leader.

CIO Magazine’s 2010 State of the CIO Survey also gives interesting insights into the role of the CIO (CIO Magazine, 2010). The survey was completed by more than 500 individuals who currently serve in the CIO or similar position. In one section of the survey respondents identified their top management priorities for 2010. “Aligning IT and business goals” was listed as a 2010 top management priority by 76% of those responding. Other frequently listed top management priorities include: controlling IT costs (63%), IT governance & portfolio management (54%), business process redesign (54%), leadership development/staff training (44%), and marketing/articulating IT value/business contribution (43%). It would not be surprising to see each of these management priorities high on the list of top leaders in other functional areas if IT is replaced by the name of the unit or area for which the leader is responsible.

Another section in CIO Magazine’s survey focused on critical leadership competencies. “Long-term strategic thinking and planning” was identified as a critical leadership competency by 60% of the respondents. Other critical leadership competencies identified include: collaboration & influence (35%), change leadership (33%), meeting or beating business goals (30%) and expertise in running the IT function (30%). One would expect that all but the last of these listed leadership competencies would be essential for all top organization leaders. Leaders responsible for non IT areas would of course need expertise in running the area for which they have responsibility.

Bill Krivoshik who is Marsh & McLennan’s first enterprise CIO states: “When a CEO’s three top priorities are to increase revenue, increase market share and release new offerings, it’s not the CIO’s technology skills that will help achieve those goals. It’s the CIO’s management and leadership skills-built on a foundation of strong technology skills that will help grow the top line.” (Krivoshik, 2009).

Barbara Cooper, CIO for Toyota Motor Sales USA believes “the skills to be CIO have also changed as the role has shifted from technologist to business strategist. It used to be that we could afford to let the business tell us what they wanted us to do, be good at delivering it and keep our jobs. Now, the physics and velocity of business and its demands mean you can’t afford to wait until something happens.” (Fitzgerald, 2008) In other words, IT leaders must be proactive rather than just reactive. This observation is supported by Polansky, Inugani, and Wiggins. They noted that the role of the CIO is moving “from reactive support of business needs to driving innovation and competitive advantage.” (Polansky, Inugani, and Wiggins (2004). To be a proactive leader who helps develop and implement business strategy the IT leader must have a clear understanding of business strategy, goals, and processes.

Ausin, Nolan, and O’Donnell observed that “The successful technology manager is often distinguished not by command of any single set of knowledge or skills, but by an ability to master changing demands – to learn, in other words.” (Ausin, Nolan, and O’Donnell, 2009) This seems especially true for information technology managers. The CIOs must do more than just master changing demands, they must be change leaders. By partnering with the corporate leadership team they must judiciously promote changes that will leverage information technology to make positive contributions throughout the organization.

It seems clear that the roles the CIO must fulfill and the rolls that other key business leaders must fulfill have much in common. While CIOs need a solid understanding of information technology, they will increasingly be evaluated based on their ability to partner with others in developing a strategy that promotes enhanced profitability for the organization.

## QUALIFICATIONS FOR THE CIO POSITION

“The ideal qualifications for the CIO are changing as the IT function becomes more central to business planning and operations.” (Polansky, Inugani, and Wiggins, 2004).

Traditionally we might expect that the CIO will have advanced through the ranks within an IT unit and they will have prepared for their first IT related job by earning a degree with a major in computer science, information systems, information technology or some related area. While today this is true in some cases, this is only part of the picture and there are almost as many paths to the CIO position as there are CIOs. A recent article in *ComputerWorld* (Stackpole, 2010) gives examples of former coaches, liberal arts majors, teachers, and an Air Force air controller who became CIOs. These are not isolated examples. It is not uncommon for individuals who have developed the business skills and understanding to be asked to apply those skills and abilities in an IT environment. For example, Manish Choksi, CIO of Asian Paints, held positions in sales, engineering and marketing before becoming CIO and chief of corporate strategy (*InformationWeek*, 2010). John Soat quotes Umesh Ramakrishan, vice chairman of executive search firm CT Partners “We’re seeing a lot more business leaders being brought in to fill the CIO role. ...Those with proven records of solving business problems and increasing revenue streams are the ones most in demand.” (Soat, 2008) However, Sobol and Klein found that larger more successful firms tend to have CIOs with a technical emphasis or technical background (Sobol and Klein, 2009).

Sobol and Klein also observe that IT executives need more business education in strategic management (Sobol and Klein, 2009). Weiss and Anderson found that IT professionals need more understanding of the financial, strategic, and political aspects of their projects (Weiss and Anderson, 2004). The CIO position is not the only IT position where business knowledge is required. Those IT professionals who work with business units to develop applications and improve processes certainly need business knowledge. C. K. Lee analyzed job postings for systems analysts in Fortune 500 organizations. He found that 83% of the job advertisements mentioned general business knowledge and 60% of those advertisements required specific functional area business knowledge (Lee, 2005).

To obtain the required business skills and knowledge an individual who starts their career as a programmer, systems analyst, systems administrator, or network technician must be given opportunities that provide them wider exposure and the ability to develop an understanding of business goals and objectives. They must also develop an understanding of how IT facilitates achievement of those goals and objectives. Mentoring, career coaching, and job shadowing are being used in some organizations to address this challenge (Fitzgerald, 2007). Likewise the individual who starts their career in sales, marketing, engineering or some other area must develop an understanding of IT and how IT adds value within the organization. Fitzgerald also reports that American Airlines uses job rotation to bring business people into IT for three years and send interested IT staff to business units for three years (Fitzgerald, 2007). Many organizations use formal IT succession planning; however, in a recent survey of 100 IT professionals, on-the-job experiences were considered to play a more important role in career development than succession planning (Overby, 2010). Overby quotes Steve Finnerty, vice president of information technology and vendor services at Applied Materials, as saying that “ten percent of IT leadership development can happen in a classroom... The rest happens on the clock.” Experiences such as project management, systems implementation, and business process design are essential to the development of a well rounded IT leader (Overby, 2010).

## CIO EDUCATIONAL PREPARATION

What role does educational preparation play in developing the CIO candidate’s background? *InformationWeek* profiles of current CIOs provide insight into the undergraduate and graduate majors that CIOs pursue. The profiled CIOs hold the CIO position in leading businesses and government agencies. Data from sixty of those recent profiles was compiled to determine the distribution of undergraduate and graduate degree majors (*InformationWeek*, 2008-2011). Undergraduate majors were listed for 64 of the 78 profiles examined. Table 1 shows the distribution of undergraduate majors.

**TABLE 1  
CIO DISTRIBUTION OF UNDERGRADUATE MAJORS**

Undergraduate Major	Number	Percent
Computer Science	12	18.75
Information Systems, Management Information Systems or related area	6	9.38
Business (accounting, management, marketing, finance or related area)	9	14.06
Engineering	16	25.00
Others	21	32.81

Wayne Brown in his “2007 Higher Education CIO Effectiveness Study” reported the undergraduate degree majors for 173 higher education CIOs who responded to his survey (Brown, 2007). Table 2 summarizes his results.

**TABLE 2  
UNDERGRADUATE MAJORS OF HIGHER EDUCATION CIOS**

Undergraduate Major	Number	Percent
Computer Science	23	13.29
Information Systems, Management Information Systems or related area	15	8.67
Business (accounting, management, marketing, finance or related area)	53	30.64
Engineering	14	8.09
Others	68	39.31

In both of these cases the CIOs exhibit a wide variety of undergraduate degree majors. Although they have a different focus, the computer science and information systems related degrees can both be considered computing related degrees. In Table 1, eighteen or 28.12% of the CIOs have a computing related degree at the undergraduate level while forty-six or 71.88% of the CIOs have an undergraduate major that isn’t directly related to computing. For the higher education CIOs, thirty-eight or 21.97% have a computing related degree at the undergraduate level while 135 or 78.03% have an undergraduate major that isn’t directly related to computing. Thus, in both cases most of the CIOs are not following what might be envisioned as the traditional approach of getting a computing degree and starting their career in some information technology area. For the CIOs profiled in *InformationWeek*, 14.06% have a business related undergraduate degree while 30.64% of the higher education CIOs have a business related degree.

The academic preparation pattern at the graduate level is clearer for the CIOs profiled in *InformationWeek* (*InformationWeek*, 2008-2011). Master's Degree majors were reported for forty-one of the CIOs profiled. Table 2 shows the distribution of Master's Degree majors.

**TABLE 3**  
**CIO DISTRIBUTION OF MASTER'S DEGREE MAJORS**

Master's Degree Major	Number	Percent
Computer Science	3	7.32
Information Systems, Management Information Systems or related area	6	14.63
Business (accounting, management, marketing, finance or related area)	26	63.41
Engineering	3	7.32
Others	3	7.32

There is a clear tendency for the CIOs to focus on business for their graduate level education. This is not surprising since business knowledge and skills are essential for any successful CIO and information technology professionals may in many cases have several years experience before they begin graduate studies.

There is no one prototypical career path leading to the CIO position. This may be partially due to the nature of the position, but it may also be due to the fact that the CIO position is relatively new and it has changed and grown in importance as organizations have come to depend on their information systems and information technology to remain competitive.

As computing related degrees evolve they may incorporate more of the business topics important for aspiring CIOs. Many information systems degrees already blend computing, information systems, and business topics throughout the degree requirements. Recently the Association for Computing Machinery (ACM) and the Association for Information Systems (AIS) developed new information systems degree recommendations (Topi et al., 2010). These recommendations reflect changes within the field over the past ten years and they provide a core that is complemented by options that can support a variety of different career tracks.

## CONCLUSION

For those preparing to be a chief information officer their academic background and career experiences must combine so they are prepared to fulfill the business strategist, integrator, relationship architect, educator, utility provider, and information steward roles. The keys are business skills and knowledge combined with an understanding of information systems and information technology and how those systems and that technology can create value for an organization. The business knowledge and skills are similar to those required of any C-level executive in the organization. There are many paths the aspiring CIO may take to acquire the appropriate complement of skills and knowledge. CIO profiles in *InformationWeek* (*InformationWeek*, 2008-2010) as well as data presented in the 2007 Higher Education CIO Effectiveness Study (Brown, 2007) show that there is wide variety in CIO undergraduate academic preparation. CIOs pursuing graduate degrees tend to focus on business. The career path to the CIO position frequently includes time spent in several different business units where business understanding,

knowledge and skills can be enhanced. Creative organizations will use techniques such as mentoring, career coaching, and job shadowing to enhance the pool of candidates for top information systems leadership positions.

## REFERENCES

Austin, R.B., Nolan, R.L., and O'Donnell, S. (2009). The Technology Manager's Journey: An Extended Narrative Approach to Educating Technical Leaders. *Academy of Management Learning & Education*, 8, (3), 337-355.

Brown, Wayne A. (2007). 2007 Higher Education CIO Effectiveness Study. pp 1-12. Retrieved from [media.govtech.net/pub\\_images/pcio/Apr\\_May08/Higher\\_Ed\\_CIO.pdf](http://media.govtech.net/pub_images/pcio/Apr_May08/Higher_Ed_CIO.pdf), May 14, 2010.

*CIO Magazine*. (2010). State of the CIO Survey. CSO Media Inc. (2010). pp. 1-12. Retrieved May 15, 2010 from [www.cio.com/documents/pdfs/StateoftheCIOJanuary2010.pdf](http://www.cio.com/documents/pdfs/StateoftheCIOJanuary2010.pdf).

Fitzgerald, M. (2007). How to Educate Your Business Leaders; CIOs need to know business issues. But business people don't need to know about IT—a fact that can hurt a business and IT executives. Here's how to educate business people without alienating them. *CIO magazine*, 20, (15), pg 1.

Fitzgerald, M. (2008). Finding Tomorrow's Leaders Today; Retirement, outsourcing and a tight talent supply are thinning IT's leadership ranks. CIOs talk about the problem and share tactics for growing tomorrow's leaders. *CIO Magazine*, 21, (15), pg 1.

*InformationWeek*. CIO Profiles, United Business Media LLC, August 8, 2008 – April 9, 2011.

*InformationWeek*. Global CIOs. United Business Media LLC, June 28, 2010 issue 1,272 14-17.

Krivoshik, B. (2009). *CIO Insight*. Issue 110, pg 18.

Lee, C.K. (2005). Analysis of Skill Requirements for Systems Analysts in Fortune 500 Organizations. *The Journal of Computer Information System*, 45, (4), pg. 84.

Overby, Stephanie, (2010). Pathways to Leadership. *CIO Magazine*, 23, (10), 37-51.

Polansky, M., Inugani, T., and Wiggins, S. (2004). The 21<sup>st</sup> Century CIO. *Business Strategy Review*, 15, (2), 29-33.

Soat, J. (2008). The Evolution of the CIO – The role of the CIO is at a critical point of change. It's time for CIOs to step up – or step back. *Information Week Wall Street & Technology*, 26, (1), pg 30.

Sobol, M. and Klein, G. (2009). Relation of CIO background, IT infrastructure, and Economic Performance. *Information and Management*, 46, 271-278.

Smaltz, D.H., Sambamurthy, V., and Agarwal, R. (2006). The Antecedents of CIO Role Effectiveness in Organizations: An Empirical Study in the Healthcare Sector. *IEEE Transactions on Engineering Management*, 53, (2), 207-222.

Stackpole, B. (2010). High-tech careers: CIOs who took an alternative route to the top. *ComputerWorld*, June 14, 2010.

Topi, Valacich, Wright, Kaiser, Nunamaker, Sipior, & Vreede. (2010). IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information Systems. *Communications of the Association for Information Systems*, 26, Article 18. Retrieved July 7, 2010 from <http://aisel.aisnet.org/cais/vol26/iss1/18>.

Weiss, J. and Anderson, D. (2004). CIOs and IT Professionals as Change Agents, Risk and Stakeholder Managers: A Field Study. *Engineering Management Journal*, 16, (2), pg 13.