CHIEF INFORMATION OFFICER PROFILE IN HIGHER EDUCATION

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Abstract: The purpose of this paper is to provide an unbiased picture of what many universities seek and expect in terms of requirements, attributes, competencies, and expected functions and duties in IT executive candidates, namely the Chief Information Officer (CIO). The paper provides a benchmark that can be used by universities to compare or build their IT leadership profiles. The study examines the education, experience, and other skills requirements in 374 active and archived electronic web advertisements for the position of CIO. It also looks at the expected job requirements for that role. The findings suggest that universities' criteria and requirements for CIOs may vary based on factors such as the organization size and needs, the complexity of the organizational structure, and available budget, but are overall comparable with those of other industries.

1 INTRODUCTION

With the rapid developments of Information technologies, and the growing cost associated with it, higher education institutions are shifting to sustainable, long term, strategic approaches for their IT function (Nelson, 2003).Today, more Chief Information Officers (CIOs) are reporting directly to their organization's Chief Executive Officers (CEOs) and serving on the organization's executive management team (Zastrocky, 2000). However, this new direction is not trouble-free. Chief Information Officers in higher education suffer shortage in number, limited longevity in the job, and an expected high rate of retirement in the next ten years (Katz, et al, , 2004), (Brown, 2009). In addition, despite the increased prevalence of the Chief Information Officer position, no single model seems to realistically explain what to be expected of a Chief Information Officer within the various organizational contexts (Nelson, 2003).

As higher education institutions plan and examine their IT performance and long term strategies; a closer look at the qualifications, attributes, and expected functions of those who shape these organizations IT strategy is deemed appropriate.

Higher education institutions are not only reliant on information technologies for their managerial and administrative and managerial needs, but also for their education delivery needs (Rezgui and Marks, 2008). Although the IT higher education environment may share many attributes with other IT environments, the IT higher education environment has its unique attributes. IT in higher education tends to be more centralized and in-sourcing by nature (Brown, 2007). It is also uniquely characterized by equipment diversity, user diversity, and a calculated IT security balance between sharing access to knowledge systems and properly securing those very same knowledge systems (Rezgui and Marks, 2008).

The purpose of this paper is to provide an unbiased picture of what many universities seek and expect in terms of requirements, attributes, competencies, and expected functions and duties in an IT executive candidates, namely Chief Information Officers.

While this paper does not address which attributes or functions are more or less appropriate, it provides a benchmark that can be used by other universities to compare or build their IT leadership profiles. The subsequent sections of this paper present the reader with the study's literature review, methodology, findings, discussion and recommendation, and finally the conclusion of this study.

2 RELATED WORK

The title of the senior IT executives in the institution may vary wildly. According to Brown, (2007), while the title "IT Director" was the most commonly used title to refer to the top IT executive within the organization in surveys between 2003 and 2006; the 2007 survey shows that the "Chief Information Officer" title is now the most commonly used to refer to the top IT executive person. For the sake of this study, references to IT executive leadership and Chief Information Officers are synonymous.

References to titles such as Chief Information Officers date back to the 1980s (Synnott, et al, 1981). Early literature suggests that initially Chief Information Officers appeared in organizations with emphasis on the effective management of information; and mainly due to two factors; the first is the dissatisfaction with the performance or productivity of information technology management; and the second is a vision by executive management that information is of strategic significance to the organization (Penrod, et al, 1990). As many organizations shifted their IT management approach from operational-focused to a strategic-focused, the function of IT management was also shifted from computer personnel to a centralized strategist, hence the emergence of the chief information officer (Alter, 1988). With the shift of the functions of the Chief Information Officer, the qualification emphasis was also shifted from high technical expertise to less technical expertise and more strategic planning (Nelson, 2003). Today, the Chief Information Officer function is highly shaped by the primary mission and culture of the organization. In higher education, the Chief Information Officer must focus on the institution's educational vision, mission, and goals (Penrod, et al, 1990).

The 2007 Higher Education CIO Effectiveness Study conducted by Brown provides us with a glimpse into the profile of today's CIOs in higher education. It is important to note that the survey shows the current status of the Chief Information Officer level of education, not the status when they were originally hired for the position. The study reveals that 57% of the examined CIOs possess a Master degree in a related discipline, while 17% possess a doctorate degree, and 22% possess a bachelor degree. Although supported by studies, it has also been my observation that CIOs with undergraduate level of education tend to pursue post graduate studies after being hired for executive positions (Katz, et al, 2004). Most of the CIOs examined majored in disciplines such as business, computer systems, education, information technology, and engineering. The study also reveals that prior to being hired for their current position; the majority of the examined CIOs had prior IT experience within higher education. In terms of organizational hierarchy, the majority of CIOs reported to the organization's (CEO) (31%), or the Chief Financial Officer (CFO) (18%), or other assorted and academic VPs (30%). In addition, most of the examined CIOs were members of the organization's executive committee. Brown's study reveals a more optimistic numbers than early studies in terms of CIO's tenure. The average number of years spent by a CIO in his/her position averaged 7 years compared to 3 years in earlier studies. When asked about the most important and least important roles within their job description, most of the surveyed CIOs viewed providing IT support and contract oversight to be the most important roles within their job description, while they viewed organizational strategic planning and revising business process, and educating employees as the least important roles within their job description (Brown, 2007).

Nelson (2003) views the CIO role as one that requires the directorship of business factors, technical factors, and organizational and behavioural factors. He also suggests that CIOs should be able to manage relationship with relevant others; convey relevance and value of IT; and plan and implement IT-Based solutions. Penrod (1990) summarizes the primary responsibility of the CIO in aligning the information technology enterprise with the mission and goals of the institution. Brown (2007) suggests that for CIOs to be effective, they should possess communication skills, IT knowledge, political sensibility, and strategic business knowledge. He further explains that communication skills may include the CIO's fluency in the business language, his or her fluency in the language of higher education as well, and the ability to communicate and present information in non-technical terms; while IT knowledge may include an in-depth understanding of how IT is applied in the organization, the ability to use current IT resources to fill institutional requirements, the ability to use new technologies for the institution, and familiarity with the acquisition of IT. Political sensibility may include the ability to assess situations that might be challenging and confrontational, the ability to work well with the majority of people; and finally strategic Business Knowledge may include knowledge of institutional offerings; understanding

of market and business process, and familiarity with competition.

Recent studies on the role of the CIO within higher education suggest that in addition to managing the IT enterprise within the organization, CIOs should become more active within their executive management role by making contribution to the development and management of business strategies and directions rather than being constrained to role of IT communicator. Being a member of the university executive team, the 21st century, a CIO is expected to participate in university's' political and public relations, financial issues, general strategy. CIOs should understand the CEO concerns and they should communicate with the executive team in regular basis (Katz, et al, 2004), (Zastrocky, 2000).

3 METHODOLOGY

This study examined the findings from 374 active and archived electronic web advertisements for the position of CIO between the periods of January of 2007 and October of 2009. 282 of the examined advertisements came from various higher education institutions, while the remaining 92 came from other industries. The study itself took place between May and November of 2009. This study examines the common attributes that shapes the profile of the CIO universities seek to hire. The profile includes key qualifications, competencies, attributes, and expected duties. In addition, the study briefly compares the examined CIO profiles in higher education with their parallels in other industries.

While the study seeks to reveal what many universities seek in a CIO, the study does not address why universities seek these specific attributes. It should also be noted that universities criteria and requirements for a CIO may vary based on factors such as the organization size and needs, the complexity of the organizational structure, available budget, and other factors that fall outside the scope of this paper, mainly because their influence before the ad is drafted is stronger than after. Perhaps, this is the subject of another study. For the sake of this study, we assume that most universities make a rational decision of what they seek in a CIO. To conduct a comprehensive review of the attributes and the function expected of a CIO, several electronic web sites and databases were searched including higheredjobs.com, educause.edu, chronicle.com, monster.com, careerbuilder.com, and several large universities web sites including

University of North Carolina – Chapel Hill, University of Central Florida, Carnegie Mellon University, Texas A&M University, and George Town University.

The study looks at four major sections within the advertisements, they are: required education, required experience, other requirements and preferences, and job description and expected functions. The following research question has been identified to guide the investigation:

1. What are the key qualifications sought by universities when hiring Chief Information Officers?
2. What are the main duties expected from a Chief Information Officer?

4 FINDINGS

Universities seek a number of factors when seeking CIOs. In almost 96% of the examined advertisements, the criteria sought included education, experience in IT management, and experience in related industry. None of the examined advertisements sought only a single criterion. The findings also revealed a consistency in the order of the listed criteria; which may seem to reflect the level of emphasis on those criteria. In 84% of the examined advertisements, education was listed first, followed by the required number of years of experience in IT management, followed by experience in the related industry, and then followed by additional requirements. Education and the number of years of experience are usually listed as requirements, while experience in the related field and other preferences are usually listed as highly desirable. A small percentage of the examined advertisement (4%) did not list required attributes, and only focused on expected responsibilities.

4.1 Required Education

In terms of the required level of education, this study indicates that almost all examined universities (96%) seeking CIOs required a minimum level of education. Education is usually listed as the first requirement. 76% of the examined advertisements required a minimum level of education of a Master degree, while 11% of the examined advertisements required a minimum level of a doctorate degree, and 9% required a minimum level of a Bachelor degree. 4% of the examined advertisements did not list education as one of the qualifications. In reference to relevant education disciplines, 62% of the examined advertisements listed more than three possible

disciplines, while the remaining 38% listed less than three possible disciplines. The majority of disciplines listed included information technology, information systems, management of information systems, computer science, management, engineering, and education. Depending on the minimum level of education required, some of the advertisements allowed for substitution between education and experience. A graduate degree may be substituted for two years of the required experience.

4.2 Required Work Experience

In terms of required work experience, 53% of the examined cases required a minimum of 10 years of prior-related working experience, while 32% required a minimum working experience of 7 years, 4% required less than 7 years of experience, and 4% required more than 15 years of experience. 7% of the examined cases did not list the required number of years of experience; instead they used other qualitative terms such as "Extensive Experience" or "significant experience" to describe the required level of prior work experience. This study also revealed that 93% of the examined advertisements listed applicable and related experience in higher education, management, or IT management as a condition, without listing any requirements in terms of prior roles. Only 7% of the examined cases listed something in line with "prior working experience as a Chief Information Officer or an IT manager is required" or "previous work experience in Higher Education, as an Information Technology Manager required". 72% of the examined advertisements listed prior higher education experience in IT as highly desirable, while 15% listed it as a requirement, and 13% did not include it as a criterion in their advertisements. 70% of the International higher education institutions examined listed prior international experience as a preference as well, while 21% listed it as a requirement, and 9% did not list it as a criterion in their advertisements.

4.3 Other Requirements and Preferences

Based on the needs of the university and the special requirements of the position, some the advertisements for a CIO included a statement listing specific requirements or additional preferences. 87% of the examined advertisements listed excellent leadership, management,

interpersonal, communication, organization, and collaborative skills as a condition, while 63% of the examined advertisements listed technical competence; knowledge of current and emerging information technologies; broad knowledge of networking, information security, telecommunications, administrative systems, education-delivery systems, web technologies and user support services as a requirement as well. Only 24% of the examined advertisements listed knowledge of project management concepts, tools and techniques as a requirement. 28% of the examined advertisements required broad knowledge of developments in academic and administrative information technologies. Strong customer service orientation; and the ability to build consensus for strategy and execution among diverse constituents were also listed among other requirements in 22% of the examined advertisements.

In terms of specific technical knowledge, 52% of the examined advertisements required experience in one or more of the following: specific software development methods, specific platforms, specific protocols, specific application systems, or specific set of technical skills, while 31% listed a general statement in line with "ability and experience with a variety of computing environments". The remaining 17% did not specify any technical requirements. The examined advertisements also revealed other requirements such as experience and skill managing departmental fiscal responsibilities (41%); prior experience within a research, teaching, or academic environment (46%); and the ability to effectively establish and maintain cooperative working relationships within a diverse multicultural environment (8%). 28% required an understanding of the unique character of higher education institutions, including shared governance, academic culture and the expectations and needs of the different constituents.

4.4 Principal Duties and Reporting Structure

In 36% of the examined advertisements, it was found that the title of the CIO was joined with the title "Vice President of Information Technology". In 32% of the examined advertisements the title of the CIO was joined with the title "Executive Director of Information Technology". In 22% of the examined advertisements, the title of the CIO was not joined with any other titles; and in 10% of the examined advertisements, the title was joined with an "Associate or Assistant - Vice President",

"Associate or Assistant - Provost" or "Associate or Assistant - Chancellor" title. While the reporting structure may be obvious for some titles such as "Associate Provost & CIO" or "Associate Chancellor & CIO"; the case may be different for other titles such as "Executive Director/CIO or just "CIO".

Only 78% of the examined advertisements listed the reporting structure of the CIO position. While 98% of the examined advertisements described a single direct line of reporting; 2% reported a dual line of reporting (Primary and secondary). In these cases, the CIO reported primarily to the Provost and secondary to the V.P of Finance and Administration. 90% of CIOs with a Vice President title did not report directly to the president; instead they reported to senior vice presidents or Executive vice Presidents. 88% of CIOs with Executive Director Title reported to other vice presidents such as V.P of Planning and V.P Administration. Only 12% reported to non-V.P title such as the president or the provost. Similarly, CIOs with associate or assistant V.P title (100%) reported directly to other V.Ps such as the Vice President of Finance and Administration (86%) or the Vice Presidents for Academic Affairs (14%). Finally, CIOs with no other title associated reported to a variety of other executive positions such as the chancellor, the provost, and the CEO. 82% of the examined advertisements reported that the CIO is expected to serves as a member of the senior or executive administrative council or committee.

In terms of principal duties, 84% of the examined advertisements reported that the CIO is expected to provide vision and direction in line with the university's overarching vision and strategic plans; leverage the use of technology to transform higher education administration, teaching and learning, research and collaboration; and manage all aspects relating to information technology (IT) at the University, including staffing, budgeting, planning, purchasing, and policy development. In 74% of the examined advertisements, universities listed that the CIO is responsible for the planning, development, coordination, and implementation of the university IT strategy, IT policies, and IT systems that support the strategy of the university. 58% of the examined advertisements specified the number of staff and the expected annual budget the CIO is expected to manage.

While the majority of advertisements used broad language as shown above, 28% were more specific in terms of what is expected of a CIO. For instance, some of the advertisements listed that responsibilities include oversight of Information Security, Application Technology Support (including academic and administrative systems), Classroom Technology Support (including media services and class/lab support), and Infrastructure Technology Services (including telecommunications, network services and help desk). Others stated that the CIO is expected to serve three types of internal stakeholders: faculty, students, and administrators. The CIO serves faculty by providing the computing systems necessary to support teaching and research. He serves students by providing them with the resources required to support their classroom and online activities. The CIO supports administrators by providing them with the ability to manage the university enterprise system to facilitate business operations. The CIO plays a key role in the support of the College's growing on-line education initiatives and works closely with faculty on research grants and grant opportunities.

In general, it was found in more than 70% of the examined advertisements that universities expect CIO to do many, if not all of the following functions:

- Oversee University-wide IT governance; facilitate discussion of IT plans and policies at all levels of the administration; work with the IT area and University to prioritize activities and plan initiatives that are in line with the strategic objectives and mission of the University; and serve on the University's IT Steering Committee.

- Manage IT architecture; maintain standards and develop appropriate guidelines for the deployment of information technologies throughout the University.

- Manage IT acquisitions to enhance and expand enterprise applications to streamline the business processes of the University.

- Oversee IT security expanding upon the computer and network infrastructure and security planning for the campus.

- Update IT policies as required by external regulations and to reinforce the appropriate use of technology.

- Promote and enhance collaborative communication.

- Obtain convergence of IT at all levels — not just structures.

- Continue to work on enhancing a positive culture at the University regarding IT.

- Advance the development (training) of IT staff in areas of technical skills, customer service, and overall professionalism.

- Provide a University-wide training program for administrative applications, learning management systems, productivity applications and exposure to new technologies.

- Direct strategic initiatives to significantly increase the University's online presence.

- Coordinate initiatives to minimize duplication of effort, realize operating efficiencies, minimize costs, and bring process improvements to the University. The following sections discuss the findings of this study and puts recommendations forward.

5 DISCUSSION AND RECOMMENDATIONS

As the findings of this study indicate, the CIO is the highest IT executive position that usually reports to a senior executive authority such as the provost, CEO, or an executive vice president. In most cases, the CIO title is joined with Vice President, associate, or assistant, for Information Technology title. The CIO is often a member of the university's executive or senior committee. Reporting to the CIO is a number of directors in charge of networking, communication, enterprise and applications support, help desk support, IT security, IT training, IT project management, IT reporting, web services, etc. Each director may have directly a number of staff members reporting to him/her or indirectly through a manager(s). Again, based on the organization structure and the size and the need of the organization; in some universities some of the above functions are combined under the leadership of one director, while in other universities, these functions could be individually assigned.

The CIO profile in higher education seems to be highly competitive with those of other industries. While most of the requirements were almost identical in terms of minimum level of education, required experience, and other IT competencies; one of the main differences was prior experience within related industry. The findings if this study indicates that most universities seeking CIOs shared the following basic requirements:

- A minimum level of education of a Master degree in a discipline such as information technology, information systems, management of

information systems, computer science, management engineering, and education.

- A minimum of 10 years of related work experience in IT management, preferably in higher education.

- Technical competence; knowledge of current and emerging information technologies; broad knowledge of networking, information security, telecommunications, administrative systems, education-delivery systems, web technologies and user support services.

- Excellent leadership, management, interpersonal, communication, organization and collaborative skills.

Experience in one or more of the following: specific software development methods, specific platforms, specific protocols, specific application systems, or specific set of technical skills

While these basic requirements were shared among many universities, fewer universities listed additional requirements such as:

- Knowledge of project management concepts, tools and techniques.

- Broad knowledge of developments in academic and administrative information technologies.

- Strong customer service orientation; and the ability to build consensus for strategy and execution among diverse constituents.

- Experience and skill managing departmental fiscal responsibilities.

- Prior experience within a research, teaching, or academic environment.

- Ability to effectively establish and maintain cooperative working relationships within a diverse multicultural environment.

- Understanding of the unique character of higher education institutions, including shared governance, academic culture and the expectations and needs of the different constituents.

Many of the examined advertisements indicated the reporting structure and a brief synopsis about the university. Only 41% of the examined advertisements included information about expected compensation and other benefits. Only half of the examined advertisements included information about the size of the IT department to be managed or the annual budget. Although the positions advertised are full time positions, the number of working hours

(usually 40) was not listed in the majority of the advertisements.

In terms of principal duties, the CIO is expected to provide vision and direction in line with the university's overarching vision and strategic plans; leverage the use of technology to transform higher education administration, teaching and learning, research and collaboration; manage all aspects relating to information technology (IT) at the University, including staffing, budgeting, planning, purchasing, and policy development. The role of the CIO is no longer restricted to the technical realm; CIOs must engage themselves in the management of the university not only the IT enterprise.

6 CONCLUSIONS

The findings of this study provide universities and IT personnel with important information regarding what many universities regard as appropriate attributes and expected duties of IT executive leadership in higher education. The paper lists education, work experience, and other skills minimum requirements; and it also describes the key duties expected of a CIO. The findings of this study suggest that higher education requirements are highly comparable with those of other industries. With all things being equal, prior experience in higher education IT management was the key difference.

There are a number of things that universities can do to improve the advertisement and selection process of a CIO:

- Include salary range information in the advertisements.
- Include a brief statement describing possible remuneration package.
- Include the number of personnel expected to be managed.
- Include the number of divisions or sub-units expected to be managed.
- Include the annual budget expected to be managed.
- Use quantitative terms to describe requirements instead of qualitative terms such as "significant experience" as the latter tend to be subjective.
- Include enough details of what is expected of a CIO in the advertisements, not only main themes.
- Include a statement encouraging minorities and

special groups to apply for the position.

The inclusion of the above items in the advertisement will help both universities and candidates. Institution should reflect a true picture of what they seek and what they expect without appearing vague or deceiving. Some institutions, especially those with "less-than-competitive" salaries don't advertise pay information. Instead, they use pompous language to attract candidates to apply for the position. The inclusion of the above information will save the candidates and the universities time, effort, and cost; and allow them to focus on their target area. It will also help universities eliminate inadequate candidates early on the process. With the shortage of Chief Information Officers and the expected rate of retirement in higher education, universities should reach out to diverse groups, especially women to maintain leadership continuity in IT executive leadership.

REFERENCES

Alter, A., 1988. The Search for Higher Beings", "*CIO Magazine,* pp. 21-22, 24-27.
Brown, W., 2008. Higher Education CIO Effective Study. *EDUCAUSE*.
Brown, W. A Study of the CIO Roles and Effectiveness in Higher Education. Retrieved September 28, 2009, from http://campustechnology.com/articles/2009/05/13/a-study-of-cio-roles-and-effectiveness-in-higher-education.aspx
Katz, N., Kvavic, Robert, B., Penrod, J., Pirani, A., Nelson, J., Marks, R., and Salaway, G., 2004. Information Technology Leadership in Higher Education: The Condition of the Community. *ECAR*.
Nelson, M., 2003. CIO in Higher Education: Leadership, Competences, Effectiveness. *ECAR*.
Penrod, J., Dolence, M., and Douglas, J., 1990, The Chief Information Officer in Higher Education. *CAUSE*,
Rezgui Y., and Marks A., 2008, Information Security Awareness in Higher Education. *Computers and Security.*
Synnott, W., and Gruber, W., 1981, Information Resource Management: Opportunities and Strategies for the 1980s. *Wiley.*
Zastrocky, M., and Schlier, F., 2000, The Higher Education CIO in the 21st Century. *EDUCAUSE Quarterly.*