■ *Research Article*

CKO Wanted — Evangelical Skills Necessary: A Review of the Chief Knowledge Officer Position

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One of the key challenges for business executives in the knowledge era is to manage intellectual capital. Drawing upon: (1) the author's personal experience as CKO of Knexa.com – the world's first knowledge exchange auction; and (2) the relatively nascent literature on the roles and responsibilities of CKOs, this paper highlights five perspectives that a CKO must embrace to be successful: (1) CKO as Knowledge Sharing Icon; (2) CKO as Trust Steward; (3) CKO as Total Trainer; (4) CKO as Techno Nerd; and (5) CKO as Number-crunching Accountant. Copyright © 2001 John Wiley & Sons, Ltd.

The following conversation was overheard by the coffee machine between an executive at Knowing Nothing Inc. and a prospective client:

Patty: Congratulations, I read the announcement regarding your promotion in the Newspaper today on my way over here. What does CKO stand for?
Stacy: Chief Knowledge Officer.
Patty: Wow... I should be lucky to be doing business with you. You must be really smart.
Stacy: No... not really. I just have lot of knowledge.
Patty: You mean you don't have to be smart to be a CKO? That sounds a little strange. How did you get the job?
Stacy: Well, I was originally hired as a Thinking Analyst out of Pensive University. After an intensive Training Internship and a few Conceptualization Projects I was promoted to Reflecting Associate. I successfully managed our Knowledge Map and was rewarded with a Concept Bonus. I then made a move into the Opinion Department as a Devil's Advocate, During those contemplative years, I became a well-respected sage. My Wisdom Supervisor felt that I should broaden my horizons and moved me laterally to the Accounting and IT departments where I was a Number-cruncher and then a Techno Nerd. I also had a brief stint in HR as a Trust Steward and then a Total Trainer Prior to my return here. I had been Director of Opinion for a couple of years prior to my appointment as CKO. I am really happy now.
Patty: Uh ... did I mention that I have to get back to my office within the hour?

INTRODUCTION

The dialogue above represents a light-hearted view of the field of knowledge management (KM) and the role that a CKO (Chief Knowledge Officer) plays in it. Nevertheless, both KM and the role that CKOs play are critically important in today's turbulent and information-rich business environment. The purpose of this paper is to highlight the multi-disciplined perspective that a CKO must embrace to be successful. The paper is divided into five sections based on the following disciplines:

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- CKO as Knowledge-sharing Icon
- CKO as Trust Steward
- CKO as Total Trainer
- CKO as Techno Nerd and
- CKO as Number-crunching Accountant

Before CKOs begin to view their critical role in organizations they must comprehend the role of knowledge in business. As Bhatt (1998) puts it:

Knowledge is not a physically identifiable entity. It can be acquired, stored, manipulated, and distributed, yet management cannot ensure its validity ... Knowledge derived from technology can provide advantage to business, but, eventually, many competitors over time imitate the use of technology ... Knowledge derived from social relationships, however, can provide long-term competitive advantages to business. This is because people-centered knowledge is unique and context dependent which other firms cannot easily imitate (p. 166).

Therein lies the role of CKOs in today's business environment. It is a complex responsibility that juxtaposes both technological and social skills into an important blend. As such, a CKO is not a glorified information technologist. Furthermore, a CKO is not a legitimized human resource executive. Rather, a CKO is an evangelist who preaches and exemplifies the important skills required to leverage the knowledge embedded in every person and system.

Evangelists are known for capturing the imagination and support of their followers. A CKO's job is to capture that same imagination from all employees while providing a charismatic spark that creates new ideas and innovation. The creation of knowledge — through personal self-reflection, interaction with other humans, or interaction with artifacts — is essentially a human process (Shariq, 1998). Knowledge management tools, processes, and software programs are considered artifacts that embody human knowledge. As such, knowledge, in its raw, intermediate or final stage, is ultimately produced for human consumption. Therefore, a CKO oversees all knowledge activities related to human behavior. The largest constraint impacting on human behavior is, and always will be, the availability of time.

Unfortunately, all employees suffer from time constraints. Limited organizational slack often favors tasks that promote efficiency as opposed to innovation. As a result, a CKO must demonstrate a special management style that caters for the pursuit of efficiency while at the same time supporting increased organizational slack. The effective management of this tension yields an innovative culture.

The state of the Chief Knowledge Officer position is very healthy. Corporate announcements of CKO placements are commonplace. Many individuals now carry business cards with the word *knowledge* somewhere in the title. Earl and Scott (1999) interviewed twenty CKOs in Europe and North America and found that they had two principal competencies: they were technologists (i.e. able to understand which technologies can contribute to knowledge capture, storage and sharing), and they were environmentalists (i.e. social networking individuals who could encourage deliberate knowledge exchange). The two critical success factors that many of the CKOs claimed they needed in the future were more organizational slack time for dreaming, thinking and talking and more higher-level support from CEOs and board members. Notwithstanding this favorable perspective, Boyd (1998) warns that many people believe that the CKO role is meaningless, unnecessary and should be avoided.

While the whole world's codified knowledge base (i.e. all historical information in books and electronic files) doubled every 30 years in the earlier part of the twentieth century, that number shrank to 7 years by the 1970s. Information library researchers remark that by the year 2010, all the world's codified knowledge will double every 11 hours. The future security of the CKO is surely safe in the light of such a prognostication. The following statistics also add to the support for a CKO as a mainstay in the corporate boardroom:

- Over half a million knowledge-intensive high-tech jobs remain unfilled in America (Kaufman and McCormick, 1998).
- Four out of five managers believe managing knowledge is essential (Stewart, 1997).
- One in five *Fortune 500* companies employ a CKO (Stewart, 1998).
- 42% of *Fortune 500* companies anticipate such an executive to be operating within the next three years (Reynolds, 1998).
- 51% of *Fortune 500* companies report knowledge management activities already underway (Reynolds, 1998).

Recent research conducted at the Institute for Intellectual Capital Research also supports the hypothesis that the CKO position will soon flourish in the corporate world. Representatives from fifty-three of the top executive search firms in Canada and the USA were surveyed about their perceptions regarding the future prevalence of CKOs. The responding headhunters conducted

specialized searches in a variety of areas including accounting, finance, IT, engineering and top executives. Forty-five per cent of those surveyed were indeed familiar with the position of CKO. More importantly, 72% of the respondents expected a significant increase in CKO searches in the future. The implication of these results is that although searches for CKOs have not yet materialized in great numbers, the executive search industry is preparing for increased demand. We are in the early trajectory of an evolutionary cycle. Another explanation of the interim results is that most CKO appointments thus far have been done internally where no external search firm was required.

Further results from the study predicted that CKOs would have no particular functional alignment but that their staff would be dispersed and embedded in business processes. Forty-seven per cent of the headhunters predicted that CKOs would have working experience in IT and be placed primarily in high-tech industries where knowledge-intensive work is at a premium.

Even though consensus on the prevalence of CKOs is still hotly debated, what is commonly appreciated is the complex role and varied background a successful candidate will need to possess. The following sections represent a brief description of the various hats that a CKO must wear to be successful.

CKO AS KNOWLEDGE-SHARING ICON

Having the distinction of being called a CKO of an organization requires an individual to represent all that is good in knowledge management. Thus, the CKO often acts as a symbol or icon that other organizational members look up to for guidance. A CKOs most important activity is to strategically leverage the knowledge an organization creates. Wijnhoven (1998) describes four reasons why we would want a CKO to promote knowledge-sharing activities:

● They promote stability during environmental turbulence
● They enable speedy delivery of productions or services
● They create high efficiency in the knowledge value chain by sharing resources synergistically
● They enable the separation of work so that specialization is feasible.

The theoretical justification for knowledge sharing rests on the fact that knowledge is not a scarce resource. Thus, it does not suffer from decreasing rates of return. Rather, knowledge

gains from increasing rates of return. For example, if I have two diamonds and I give you one, we will each have half of the original total. However, if I give you half of my knowledge, we may end up with over double the original total.

A CKO may also look to academic research for guidance in knowledge sharing. Mintzberg, Ahlstrand and Lampel (1998) suggest that knowledge sharing is a fundamental behavior within the learning school of strategic management. Accordingly, supporters of the learning school believe that the complex and unpredictable nature of an organization's environment precludes deliberate control. Mintzberg *et al.* (1998, 210–223) argue that two theories within the learning school have emerged as particularly insightful: Nonaka and Takeuchi's (1995) theory of knowledge creation, and Crossan, Lane and White's (1999) 4-I framework of organizational learning. The former emphasizes the flow of knowledge in organizations and the latter explains the importance of learning processes across multiple levels of analysis. These two theories help fill the void created by other streams of literature (i.e. evolutionary theory, resource-based view, and intellectual capital) which emphasize the stock of knowledge in organizations.

Crossan *et al.* (1999) emphasize knowledge processes that occur across the individual, group and organizational levels of analysis. Individuals interpret the environment and integrate their learning among fellow group members. That group knowledge is eventually institutionalized within the organization. Consequently, knowledge is shared among individuals, groups and organizational artifacts. A CKO must actively manage both knowledge stocks and flows in order to effectively leverage an organizational learning system (Bontis, 1999b).

Ultimately, as the symbolic icon of knowledge-sharing activities, the CKO must have a strong willingness to communicate. This willingness must be as convincing externally as it is internally (Hauser, 1998). External communication is necessary to receive timely and pertinent information from the business environment. This includes all stakeholders: suppliers, customers, shareholders, government agencies, etc. Internal communication strengthens the absorptive capacity (Cohen and Levinthal, 1990) of an organization's institutionalized learning processes (Crossan *et al*, 1999). This allows organizations to know what they know.

Bukowitz (1998) suggests that three gaps prevent people from actively sharing knowledge in a business environment: awareness gaps, communications skills gaps, and culture gaps. Awareness

We know what we know.	We know what we don't know.
We don't know what we know.	We don't know what we don't know.

Figure 1   Two-by-two knowledge-awareness matrix

gaps exist between what people know and what they are aware that they know. People generally do not have the time to contemplate their own stock of knowledge and consequently do not appreciate what is important to contribute to the organization. The two-by-two matrix in Figure 1 proposes the four areas of concentration that a CKO must focus on to reduce awareness gaps.

The upper-left quadrant of the two-by-two matrix is the starting point for a CKO because this knowledge is already contained in the organization and does not require acquisition of new knowledge whether it be by training or hiring of new managers. The upper-right quadrant forces the CKO to take inventory of holes and gaps in knowledge. The lower-left quadrant requires a CKO to come to terms with the vast wealth of knowledge that is currently untapped in the organization. Finally, the lower-right quadrant represents the so-called final frontier. It forces a CKO to contemplate the competitive intelligence and knowledge resources that are currently external to the organization.

The communications skills gap identifies the set of skills required for individuals to speak and dialogue with one another. In an international setting, a CKO faces the challenge of employees speaking many languages. In large multinational corporations where several organizational units reside in foreign countries, a CKO's communications gap is even more pronounced. As an ambassador for knowledge sharing, a CKO is required to find common tools that cross national boundaries. This includes a consistent set of research, analysis, writing and publishing skills. For example, Bukowitz (1998) reports that Arthur Andersen developed its Global Best Practices KnowledgeSpace database allowing managers from all over the world to communicate with one another by sharing knowledge on client solutions using a standard template.

The culture gap is the most difficult to manage because it involves aligning corporate and individual values. Trust remains the most important ingredient in pursuing a *knowledge-sharing* as opposed to a *knowledge-hoarding* culture. A CKO is responsible for establishing a culture that rewards and credits knowledge sharing. Therefore, a key character trait in a CKO is trustworthiness.

CKO AS TRUST STEWARD

Trust is a necessary condition for an innovative organization (Hauser, 1998). It is also a prerequisite for brainstorming which allows employees to present all ideas, even if they initially seem crazy, to each other. We primarily work in a business environment that equates knowledge with power. Thus, the incentive to freely divulge sensitive information and in fact share important knowledge with colleagues does not resonate well with our deepest desires for career advancement. Internal competition for fewer and fewer executive slots pits managers against one another, and in some companies withholding critical information is still an excellent strategy for getting ahead (Bukowitz, 1998). One of the main reasons for *hoarding* information is that we do not necessarily trust our co-workers and since our values may not be aligned we would rather not share our little secrets.

Sitkin and Stickel (1996) describe distrust in an organization as the road to hell. Their review of the literature concludes that trust has been long recognized as a fundamental feature of successful interpersonal and inter-group relations. Trust also yields interpersonal and group solidarity. They warn:

> Distrust is engendered when an individual or group is perceived as not sharing key cultural values. When a person challenges an organization's fundamental assumptions and values, that person may be perceived as operating under values so different from the group's that the violator's underlying world view becomes suspect ... the person is now seen as a cultural outsider (p 198).

A critical role for any CKO wishing to align values against knowledge hoarding is to identify these cultural outsiders. A CKO does this by closely examining the cues of such activity. Often, only certain members of work teams or departments clearly express the behavior of *individualism over the collective* at any cost. These individuals can often be identified through the use of behavior interviews and group case studies. They are often stereotyped as unfriendly and constantly suspicious of others.

When it comes to realigning the culture of trust,

the old adage 'one bad apple ...' holds true. A CKO must identify the cultural outsiders and assuage their negative impact on others who wish to create and nourish a more sharing environment. Once the individual has been identified, a CKO's role becomes more paternalistic. Individuals who hoard knowledge do so because they are fearful of the consequences of depleting their own knowledge advantage. In this case, a CKO must alleviate fear so that the individual does not feel the need for overprotection. The goal is to make the individual appreciate the consequences of sharing knowledge and appreciate the value of combining disparate perspectives.

One alternative to help align individuals desires to share knowledge deals with appropriate incentive mechanisms. People need incentives to participate in the knowledge sharing process (Hansen *et al.,* 1999). One example includes providing employees with bonuses on their performance evaluations based on contributions to corporate databases and other sources of codified knowledge. Another incentive is to reward people on the degree of high-quality person-to-person dialogue one individual has with another during collaborative processes. Both of these incentive alternatives are relatively simple and inexpensive to institute. The CKO can work closely with the HR department to amend job descriptions and performance evaluation forms to include such knowledge-sharing activities.

Another challenge facing CKOs in geographically dispersed as well as virtual organizations is that these structures do not allow for the close personal monitoring required to diagnose trust issues among employees. In these instances, the CKO has the responsibility to raise this critical issue with senior management. As the organization increases in size and scope, a whole KM department may be necessary. A decentralized structure of CKO disciples on location at various sites can help. This is done by placing knowledge analysts, managers, or facilitators in disparate locations with direct reporting lines to the CKO. These individuals have the luxury of physically working closely with others while at the same time maintaining a constant link to the CKO.

CKO AS TOTAL TRAINER

A CKO should work very closely with the HR department and especially the training and development staff. Each individual in an organization represents a wellspring of knowledge that can be leveraged. Training augments the stock of knowl-

edge embedded in human capital (Bontis, 1998). At the same time that individual knowledge is increased, old or obsolete knowledge should be forgotten. Although this sounds theoretically possible, it is actually difficult to accomplish because *old habits die hard.* Furthermore, you cannot reformat the hard drive of an employee's brain and start fresh.

A CKO should be critical about the training methodologies used by the HR staff. Research shows that LOD (learning on demand) or JIT (just-in-time) training from the multimedia desktop significantly increases mastery and retention of content by 40–70% over traditional lecture-based learning models (Trondsen and Vickery, 1998). An audit of training methods should be conducted by the CKO in tandem with the HR staff to see that modern and effective technologies are being used. Training and development staff also benefit from instant feedback and evaluation when LOD or JIT methodologies from the desktop are utilized. Furthermore, employees receive instant feedback and reinforcement while benefiting from reduced anxiety and fear of failure.

Not surprisingly, many of the leading high-tech companies of Silicon Valley — such as 3Com, Cisco, Hewlett-Packard and Sybase — are either embracing LOD/JIT training or planning to adopt it in the near future (Trondsen and Vickery, 1998). Unfortunately, even the competition's pursuit of such programs may not be enough for a CKO to convince the HR department of the need for investment. In many cases, the CKO will meet with resistance from the CIO or other senior information technology managers who recognize the enormous resources that multimedia (especially audio and video) steals away from already congested networks starving for more bandwidth.

A complementary module to LOD/JIT training programs is the Tango simulation administered by Celemi, a Swedish company. First developed by Dr. Karl-Erik Sveiby, the Tango simulation provides participants with an introduction to the concepts of valuing and managing intangible assets (Bontis and Girardi, 2000). Five or six teams compete, as simulated organizations, for up to a seven-year period (which actually takes one to two full days). Organizations compete to attract clients and knowledge workers, as well as other staff, to service those clients. Conventional financial statements provide an indication of the relative success of organizations. However, Tango demonstrates, as is increasingly obvious in real life, that conventional financial statements provide only *one perspective* of the health of knowledge-based organizations such as software, accounting

and consulting firms. Conventional financial perspectives are far from adequate for determining the health of many organizations that now generate wealth from assets that are primarily intangible. Thus, after completing financial statements, Tango teams must assess the value of the intangible portion of their organization. The intangible value of each team's organization can be boosted through the delicate and challenging process of balancing investment among a variety of choices such as: (1) acquiring the correct staff mix for implementing strategy; (2) ensuring that staff/client chemistry is aligned; (3) completing challenging projects successfully; (4) undertaking research and development; and (5) adequately training staff.

The most expensive route a CKO can follow to meet the training needs of employees while still providing a physical space for the socialization process is the corporate university. Meister (1994) argues that modern corporate universities are not only state-of-the-art training facilities, but instruments for cultural change. A significant proportion of *Fortune 500* companies have already put corporate universities in place. Employees enjoy the opportunity to leave the daily office grind for days at a time in order to socialize and collaborate with fellow-colleagues in a more friendly and enjoyable environment.

With a more limited budget, a CKO can spearhead the development of a virtual version of the corporate university. Creating knowledge through assignments are traditional learning mechanisms in academic universities. Relate these to corporate issues and you have the embryonic stages of knowledge creation. Capture the documents in databases that are networked to all organizational members and a knowledge management process emerges. Create in-company structures that build on these processes and one begins to form a learning organization. Develop programs and accredit this learning and a corporate university has emerged. Finally, use electronic publishing and communications technology to resource your programs and a virtual corporate university is born.

A CKO's toughest task as a trainer arrives when budget-allocation time draws near. Training and educational investments must add value in a measurable way or should be scrapped. If the CKO does not evaluate this first, the CFO will surely send a reminder. Costs associated with increasing individual knowledge stocks are not trivial. Buckman Laboratories spends in excess of $1000 per associate per day in each of its training facilities (Ellis, 1998). This includes transportation, lodgings, meals, the instructor, the room, equipment, and teaching materials. Opportunity costs and the cost of time away from business are not even included in the estimate.

A CKO must scrutinize each and every training investment dollar. One source of information is the Saratoga Institute in Santa Clara, California (www.saratoga-institute.com) which has been developing HR benchmarks for over 20 years. To realize the true value of training, expenditures should be measured, tracked, routinely benchmarked and evaluated. These numbers are often very difficult to locate since they are hidden in many business unit accounts. A task-force consisting of representatives from HR and Accounting in addition to the CKO is required to commence this task.

In addition to monetary expenditures, alternative metrics that can be used to evaluate programs include (Ellis, 1998):

- Associate return and turnover rates
- Time and expense needed to move a new hire to productivity
- Money saved from more effective allocation of training resources
- Consolidation of previously duplicated efforts.

A CKO must enforce a stringent watch on training investment because it is the lifeblood of new knowledge. More importantly, a CKO must remind employees that formal training via LOD/JIT multimedia desktops, or virtual corporate universities is only the tip of the iceberg. Employees must take thoughtful examination of their daily experiences in order to take full advantage of the knowledge that is available to them and to their organization.

Current trends in workplace demographics make the knowledge capture responsibility for CKOs even more difficult. Approximately 10% of the US workforce (over 12 million individuals) is considered a contingent worker (Matusik and Hill, 1998). Members of this emerging and expanding workforce jump from project to project either within or across industries often contracting their services to the highest bidder. In an effort to seek challenging work and a flexible lifestyle, contingent workers are now considered a critical resource in workforce planning.

Contingent workers bring with them systemic turnover that can be considered a negative or a positive for knowledge management processes. A CKO should influence the increased use of contingent workers when knowledge gains outweigh losses. This is the case when special expertise can be contracted and shared among permanent staff

bringing the learning curve higher for everyone involved. Limited use of contingent workers should be considered when a CKO deems that knowledge may be more readily disseminated to the public domain once a worker leaves and is free to work for the competition.

One final project that a CKO can spearhead is the development of a knowledge map. Such a blueprint requires the participation of each and every member in an organization. A knowledge map highlights the location (i.e. person, desk, filing cabinet, electronic address or directory, library, etc.) of every knowledge resource in the company. Whereas, the corporate yellow pages highlight individuals, the knowledge map high-lights the content itself. Because it is important for a CKO to know what the organization knows, a knowledge map identifies the critical domains of expertise that are critical for future success (Tissen, Andriessen and Deprez, 1998). The first step for a CKO is to translate the business strategy into key knowledge domains. These knowledge domains are where knowledge management activities must be focused. Projects that develop knowledge out-side these domains should not be given priority. The knowledge map soon becomes a strategic tool for resource allocation as it maps directly onto the overall business strategy of the firm. The goal for a CKO is to formalize the knowledge map to a such an extent that it becomes an invaluable tool for strategy making used by the CEO and the board of directors.

CKO AS TECHNO NERD

In today's world of bits and bytes, a CKO would (and should) never survive without having a strong grasp and appreciation of technology. A CKO's minimum responsibility is to be cognizant of the operating functionality of the tools in the following four KM technology categories (Bair and O'Connor, 1998):

- Information retrieval
- Document management
- Groupware and
- Integrated systems.

Information retrieval tools include e-mail mes-sages and threaded bulletin-board conversations that are mostly textual in content. The user typically searches key words to find the content that is needed. Unfortunately, individuals often find themselves sifting through voluminous amounts of useless information trying to find that one key fact or figure. Databases can also take the

form of HTML servers which allow knowledge managers to seek out information from a common standard across platforms and operating systems (Bair and O'Connor, 1998).

Document management tools allow documents to be stored in databases using attributes or metadata to enable collaborative authoring and usage. Thus, documents can be searched for, retrieved and routed based on more than just the document's contents. This allows a CKO to correspond with other key members in HR or IT departments by sharing common documents that can be constantly tracked. Furthermore, these documents may include spreadsheets, graphics, as well as audio and video.

Groupware was made famous by tools such as Lotus Notes and Dataware Systems. These tools focus on spreading individual knowledge to the group level. They are responsible for housing the corporate memory of an organization. Individuals make their personal knowledge explicit by coding thoughts, comments, ideas, and responses to a variety of topics that are clustered and categorized by content or group membership. An important consideration for any CKO wishing to support a groupware installation is that individuals must perceive a benefit in spending the time to code their thoughts in such a system. Therefore, the human incentive is a very important component in implementing such a technology. Without it, people will just visit a desert of knowledge and quickly go back to their business. Individuals must want to upload just as much information as they download.

Finally, integrated systems integrate all the above-mentioned knowledge management tools into one piece. They include information retrieval, document management, groupware as well as expert identification, data mining and warehous-ing. The goal here is to make sure that duplication of work (and thought) is minimized (or elimi-nated). The last thing a CKO wants to see is two analysts struggling with the same problem while not knowing the other one exists.

A techno-savvy CKO should also appreciate the next wave of knowledge management tools that are being currently developed due to the precipi-tous drop in cost of computing capacity (Newton, 1998). These include software modules that take advantage of artificial intelligence which can automate many knowledge-seeking tasks based on pre-determined algorithms. For example, a lawyer may wish to find all available information to help in a client's case. Once the search command is scripted, customized search agents can take advantage of free computer horsepower

that is available during off-business hours to search all related databases, intranets and Internet sites. When the lawyer arrives the next morning, a customized display of information will have already been searched, profiled, indexed and available for consumption.

One of the first tasks a CKO can accomplish is the development of a knowledge management web site. The site acts as a central focal point for the rest of the organization on a variety of knowledge management related topics such as:

- Description and status of current KM projects
- Information on current R&D work
- Services offered by the KM staff and the CKO
- Potential services that can be offered to outside clients
- Corporate yellow pages showing who knows what
- A knowledge map detailing knowledge resources in the organizations
- Testing and evaluation of KM tools and software

Although traditionally the domain of CIOs, a CKO should also be involved with the IT investment decision. According to Hansen, Nohria and Tierney (1999), Andersen Consulting and Ernst & Young have each spent more than $500 million on IT to support their knowledge management strategies. Of course, not all companies are likely to invest such large sums of money. Hansen *et al.* (1999) argue that the level of IT investment is directly related to which knowledge management strategy an organization adopts. If the firm primarily follows a codification model (i.e. employees are required to embed their knowledge in systems) then there must be investment in a system that is similar to a large electronic library (e.g. it must contain a large cache of documents and include search engines). Alternatively, if the firm primarily follows a personalization model (i.e. knowledge is shared among colleagues through dialogue) then there must be investment in IT systems that help people find one another (i.e. corporate yellow pages, expert guides).

CKO AS NUMBER-CRUNCHING ACCOUNTANT

Since 'numbers speak louder than words' (Mayo, 1999, p. 26), CKOs must also understand the world of finance and accounting. While accountants have since tackled the issue of measuring intangible assets such as brand valuation and copyrights,

contemporary auditors remain unsatisfied. Beyond the calculation of goodwill when a business is sold, and the use of voluntary disclosure notes to describe research and human resource activities, the measurement of intellectual capital is devoid of structure and consistency. After all, the measurable value of goodwill that arises when a company is sold was obviously there — in immeasurable form — before it was sold (Edwards and Bell, 1961). Since by its nature knowledge is ephemeral and context-specific, a solution to this issue may never be found — at least with the current generally accepted accounting principles.

In 1998 Arthur Andersen conducted a survey of 112 companies in Europe, 147 in North America and 109 in Asia, and found that 89% of the organizations sampled agreed or strongly agreed with the statement that 'measuring intellectual capital will be critical to the organization's ability to achieve business success'. This overwhelming support was consistent among the three groups of respondents. Furthermore, agreement was consistent regardless of company size. When asked what area should be responsible for intellectual capital measurement, roughly one third opted for a partnering effort between HR and the operating units themselves. This particular survey did not offer the choice for a CKO or the knowledge management department.

Some firms such as Skandia (Bontis, 1996) have gone even farther and published intellectual capital addendums to their annual reports to combat the issue of misleading financial statements. But a closer examination of these intellectual capital metrics yields limited generalizability and merely an indirect proxy of intellectual capital at best. Metrics such as those used by Skandia and others in the financial services industry (Bontis, 1997) will continue to be developed and analyzed longitudinally. Bassi and Van Buren (1998) note that even though the stock market is already providing handsome rewards to companies that successfully leverage their intellectual capital, few firms have formalized a measurement process. The significance and lack of progress on the issue are also clear from a recent survey of 431 organizations in the USA and Europe who ranked 'measuring the value and performance of knowledge assets' highest in importance more than any other issue except 'changing people's behaviour' 43% versus 54% respectively (Skyrme and Amidon, 1997).

A CKO may well make use Tobin's *q* as a proxy for intellectual capital (Bontis, 1999a). This ratio measures the relationship between a company's market value and its replacement value (i.e. the

cost of replacing its assets). The difference is said to be the intellectual capital of the company. Often the ratio is well over 2 to 1 and can often reach as high as 10 to 1 or higher for knowledge-intensive firms such as high-tech software companies. Because a CKO cannot measure intellectual capital in monetary terms internally, why not let the stock market decide?

There are a wealth of other tools that a CKO may consider for knowledge measurement purposes (Bontis *et al.*, 1999). Three measurement systems currently popular among practitioners include: (1) human resource accounting; (2) economic value added; and (3) the balanced scorecard. Each with its own strengths and weaknesses, a CKO would be well advised to learn about all knowledge measurement systems available.

In the final analysis, current methodologies for accounting for knowledge are still quite primitive and should not be reported externally. However, the internal use of such metrics is an important benchmark for a variety of activities that the CKO, and the KM department in general, may be instituting.

CONCLUSION

The objective of this paper was to highlight the complex roles that a successful CKO must play. The most successful CKOs will juggle these roles effortlessly rotating from accountant, to technologist, to trainer and so on. Throughout each challenging project and difficult assignment, a CKO must maintain an evangelical approach to knowledge management. The task may seem daunting to aspiring knowledge managers, and perhaps unrealistic to most CEOs. However, the importance of managing knowledge as the critical resource for sustainable competitive advantage in the information age is unwavering. What is questionable is whether or not an organization's senior executives perceive the need, early enough, to assign formal accountability to it.

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