

# Information Asset Management Capability: The Role of the CIO

*Full paper*

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## **Abstract**

This paper discusses the perspectives and role of Chief Information Officers (CIOs) in developing Information Asset Management (IAM) capability in organizations. The data set was collected through personal interviews and two focus group sessions with CIOs from knowledge-intensive industries in the USA, South Africa and Australia. The research identified the building blocks of IAM capability, namely the need for organizations to view data, information and knowledge as valuable business assets, an understanding of the cost and benefit of managing these assets, strong leadership capability, the ability to make IAM decisions for strategic purposes, the importance of developing and maintaining a culture of sharing both tacit and explicit knowledge, as well as the deployment of the necessary tools. The research also suggests that the CIO plays a pivotal role in identifying the drivers, key focus areas, critical resources and underlying activities to develop such IAM Capability.

## **Keywords**

Knowledge Management, Information Assets, Information Asset Management, Information Asset Management Capability, Chief Information Officer

## **Introduction**

Modern organizations need to actively recognize and measure key resources and drivers of value to create competitive advantage. Literature increasingly refers to information and knowledge management as a crucial organizational capability (Kettinger, Zhang and Marchand, 2011; Earl and Feeny, 2012; Banker et al., 2011). This is based on the work of earlier researchers such as Peter Drucker (1988) and Davenport and Prusak (1997) who introduced the information-based organization where information and knowledge are utilized effectively. Although the value of data, information and knowledge are increasingly recognized, few organizations are successful in deriving the business benefits by managing the data, information and knowledge as true business assets (Evans and Price, 2012). This confirms the opinion of Swartz (2007) that historically, organizations have not managed their information well.

Various terms and definitions can be employed to describe intangible information and knowledge. For the purpose of this paper the term Information Assets (IA) is used to refer to all codified data, documents and published content (explicit knowledge), irrespective of medium (hard copy or soft copy) and format (e.g. Word document, spreadsheet, email, drawing and HTML code). The definition also includes tacit knowledge that cannot easily be articulated and is difficult to transfer. These assets are inputs to the business process (Evans and Price, 2012). Information Asset Management (IAM) ensures that data, information and content are treated as assets in the true business and accounting sense and avoids the risk and cost associated with misuse of data and content or exposure to regulatory scrutiny (Ladley, 2010). Not only do IA constitute one of only four sets of assets/resources that are deployed to create value but they are the lifeblood of every business activity and process. Unlike the other three asset classes, IA are irreplaceable if lost.

Allison (2010) posits that information assets should be recognized as an important driver for institutional change and success, which challenges many prolonged views embedded in business paradigms, policies and processes. IT leaders and Chief information Officers (CIOs) need the ability to collaborate, build relationships and develop a compelling vision, They are also responsible for driving

change in their organizations (Banker et al., 2011; Carter et al., 2011; Chun and Mooney, 2007). Peppard, Edwards and Lambert (2011) define the role of the CIO as one that begins to embed capabilities to effectively manage information in the organization. They further suggest that CIOs should manage Information Assets similar to financial and marketing assets. It should be noted that managing information assets is different from Information Technology (IT) management, a topic that is widely discussed in literature (Carter, Grover and Thatcher, 2011; Luftman et al., 2013; Peppard, Edwards and Lambert, 2011; Chen and Wu, 2011). While the organizational benefits of managing information assets have been acknowledged, very few empirical studies have been conducted to understand the CIO's role in IAM.

This paper describes the perception of Australian, American and South African CIOs regarding the importance of IA, as well as the role and responsibility of the CIO in IAM. The research question is:

*How do CIOs view information assets and what is the role of the CIO in Information Asset Management?*

The paper suggests management considerations regarding capabilities required of the CIO to enhance IAM in their organization. The remainder of this paper is structured as follows: The next section covers literature on IAM, followed by a description of the research methodology. The findings section indicates the business reality and challenges as seen through the eyes of the CIO, followed by the discussion and conclusion. The role of the CIO in building IAM capability is described in the form of a number of management considerations. This is followed by suggestions for future research.

## **Literature Review**

### ***Data, Information and Knowledge Assets***

Modern organizations need to actively recognize and measure key resources and drivers of value (Rodgers and Housel, 2009). Although information systems have been used for many years and the business benefits of data, information and knowledge are increasingly recognized (Kettinger, Zhang and Marchand, 2011; Galliers and Leidner, 2013), few organizations are successful in managing them as true business assets (Evans and Price, 2012). Ladley (2010) agrees that there is a growing interest in IM at the enterprise level, yet those who are responsible for the hands-on management of information are inept at explaining what Information Assets mean to business people. Ladley (2010) raises the following question: The Chief Financial Officer (CFO) takes responsibility for the finances, the Chief Operations Officer (COO) is accountable for operations issues. Where does the CEO go for Information Asset related issues? Can it be delegated to the CIO? Ladley proposes that data, information, e-mails, web content, catalogues, memos and documents should be considered in the same way as financial and human assets by taking a holistic approach to managing information. It is possible to increase spending on "exploiting" data, such as buying more Business Intelligence (BI) tools and replicating data and content, yet Ladley (2010) posits that this will not benefit the organization unless it knows what to exploit, where the information comes from, and what it is worth to the business.

### ***Information Asset Management Capability***

The Business Dictionary (2014) describes *capability* as a measure of the ability of an entity to achieve its objectives in relation to its overall mission. Organizational capability has been defined as "the ability to integrate knowledge residing both inside and outside the organization's boundaries" (Lorenzoni and Lipparini, 1999), "a collection of processes, knowledge, skills, behavior, resources, tools and systems to perform a task" (Australian Institute of Management, 2012) and "a distinctive set of human skills, motivations, and behaviors that can contribute to achieving specific activities and influencing business performance" (Willcocks and Feeny, 2006).

Different capabilities drive the success of an organization. Information serves as a primary differentiator and provides strategic value to an organization, therefore IAM Capability becomes crucial to the success of an organization (Evans and Price, 2012; Bodnar et al., 2014). Kettinger and others (2013) refer to this Capability as the ability to support opportunities for managing the information of an organization effectively. Mithas and others (2011) define IM Capability as the ability to provide data and information to users with the appropriate levels of accuracy, timeliness, reliability, security, confidentiality, connectivity, access and the ability to tailor these in response to changing

business needs and directions. IM has also been identified as a critical organizational capability that influences the performance of an organization (Tanriverdi, 2005). In simple terms, IM involves the capability to identify what information and knowledge needs to be kept, how it needs to be organized, where it should be kept and who has access to it (Galliers and Leidner, 2013).

### ***Role of the CIO***

The role of the CIO has evolved along with the role of Information Systems in organizations (Enns et al., 2000), yet recent literature argues that the responsibilities of the CIO still remain unclear (Peppard, Edwards and Lambert, 2011). Many CIOs are technically focused on rationalising and leveraging the existing IT infrastructure (Chun and Mooney, 2009), while others have assumed the role of business strategists and process innovators (Preston, Chen and Leidner, 2008). Ponemon (2009) argues that the CIO is responsible for information collection and use, while Galliers and Leidner (2013) refer to the CIO as “gatekeepers of information”; influential individuals with the power to make decisions regarding what information will be conveyed to whom. According to Ponemon (2009) the CIO plays a key role in raising the profile of information and creating a culture of responsible IM.

As CxO level executives (e.g. CFO, CIO, CKO) in organizations continue to undervalue the importance of effective IAM practices, the CIO needs to influence their understanding of the power of information and its critical contribution to business survival and success (Kettinger, Zhang and Marchand, 2011). If the CIO does not identify the importance of having an “information orientation”, the organization will lose competitive advantage (Kettinger, Zhang and Marchand, 2011: 160). According to Peppard, Edwards and Lambert (2011) and Luftman and Zadeh (2011) the CIO needs to empower and enable business with IM capabilities. This paper identifies ways in which the CIO can contribute to the development of such IM Capability.

### ***CIO Capabilities***

IT leaders such as the CIO need to develop critical capabilities to provide business value to the respective organizations; they are no longer responsible solely for the technology base (Peppard, 2007). Literature refers to the following categories of responsibilities of CIOs, which align with the findings of the empirical research.

#### **Leadership and Management**

The CIO should align the business strategy with organizational requirements of IT (Sabherwal and Chan, 2001) while embedding information capabilities into the organization (Peppard, Edwards and Lambert, 2011). Hence, the CIO is required to play a transformational leadership role in leading the way for the organization towards the vision of information orientation (Kettinger, Zhang and Marchand, 2011).

#### **Integrating Information Technology**

New technology is viewed as an enabler to link processes with people to ensure business excellence. CIOs are identified as the top-level executives who are assigned the critical responsibility of successfully integrating IT resources with business processes to achieve organizational success (Chen and Wu, 2011). The CIO needs to be a thought leader who coordinates such business technology to shape the direction of the company and drive profitability (Wilson and Stenson, 2008).

#### **Strategic and Change Management**

The CIO has a strategic role and is accountable for the use of technology in the organization to improve strategic decision-making, to enable business processes and provide direction to drive profitability (Heller, 2007). CIOs therefore act as business innovators and catalysts for change (Chen and Wu, 2011). They need to understand the holistic organizational settings in which IT is deployed, while maintaining alignment between IT and organizational strategy (Chen and Wu, 2011). In order to introduce strategic change the CIO should be able to effectively influence peers and staff (Enns, et al., 2000).

## **Capability to influence the information culture and behavior**

Organizational culture is defined as a set of beliefs, values and norms that are expressed through organizational structures, control systems, power structures, symbols, ceremonies, myths, rituals, special language and stories which would influence the behavior of the people. Literature highlights the importance of having the right culture to ensure that the organization takes responsibility for IM (Al-Alawi and Leidner, 2007; Chun and Mooney, 2009). Ponemon (2009) argues that the role of the CIO is key in creating such a culture by managing the IT eco system and providing change leadership.

## **Research Methodology**

Due to the qualitative, exploratory nature of the research, both personal interviews and focus groups were used to collect the data.

### ***Sampling***

Purposive sampling was used to select participants who fulfil the role of CIO in their organization. The organizations ranged from Small and Medium Enterprises (SMEs) to large multi-national corporations in various industries. The sample size was not pre-specified, but determined on the basis of theoretical saturation. CIO perspectives were sought, not statistical significance.

### ***Personal interviews***

Personal interviews of 60 to 90 minutes each were conducted with thirteen (13) CIOs and IT directors from organizations in various industries in the United States and South Africa (P1-P13). An interview guide was used to focus the discussion and to promote a consistent approach (Flick, 2006; Miles and Huberman, 1994). Questions were open-ended and discovery oriented. Planned prompts (predetermined) and floating prompts (impromptu decisions to explore a comment in more detail) enabled the researchers to delve into detail as required. Particular attention was paid to confidentiality of sensitive corporate information; consent was sought, confidentiality agreements were signed, security provisions were undertaken and names of individuals and organizations remain unidentified. Consequently, the participants were willing to enter into open and trusting discussions. Each interview was audio-recorded and transcribed verbatim.

### ***Focus groups***

CIOs from six (6) different organizations (F1-F6) in Australia, were invited to participate in a two hour focus group. The organizations represented the Insurance, Health, Defence, State Government, Higher Education and Legal industries. Based on the seniority of the participants and their potential significant contributions, it was decided to conducting two separate focus group sessions with three participants (CIOs) in each session. The sessions were guided by one of the authors and tape-recorded. The authors actively sought clarification of discussion and prompted participants to share actual experiences to make arguments and concepts as concrete as possible. The participants were forthcoming with examples to support their observations of organizational phenomena.

### ***Analysis***

The interview and focus group transcripts were separately analysed by each of the researchers and then discussed to iteratively identify common patterns or themes (McFadzean et al., 2007, Strauss and Corbin, 1998). Open coding was used to identify a set of codes. Axial coding was used to refine and differentiate the categories arising from the open coding and to identify categories that are most relevant to the research questions. Selective coding was used to continue the axial coding at a higher level of abstraction (Flick, 2006). The findings and discussion are based on an analysis of the interview transcripts, compared and contrasted with published literature. The goal was to let practice inform theory and vice versa (Miles and Huberman, 1994).

## **Findings**

### ***The importance of information and knowledge as business assets***

Few organizations understand the cost of managing IA, their value to the organization and the benefit of IAM to all stakeholders. The CIOs of an Australian insurance company (F1) and an Australian university (F5) indicated that their business “is all about information” and yet they do not deal with information as an asset. F2 agreed that it is a struggle to get this message across to people and for them to understand and consequently justification for IAM initiatives is difficult. IAM is a “hard sell” and “many projects are priority before those focusing on managing information” (F2). Financial assets and people assets are higher in business consciousness (F1, F2).

Poor IAM causes rework. The CIO of a large Australian legal firm observed:

“We don’t hold the claim file, we only get it for a period of time so we’ll photocopy it and then send it back [...]. Best estimate is each file in its life is copied 3 or 4 times. It’s ridiculous.” (F3)

In legal firms the cost of bad IAM is hidden due to the availability of support staff, i.e. “secretaries who run around and make the lawyers look good, and that kind of waste in finding information is their job and that doesn’t appear in the books anywhere.” (F3)

The CIO of a Health Department (F4) observed:

“We estimate there is about a 20% inefficiency in the cost base of health based on manual processes. The Australian health sector is \$117.2 billion and if you apply the 20% some very serious money is being wasted. And a lot of that has to do with manual processes and lack of managing information as an asset. There are only a few levers that the government can pull to improve business efficiency in Health and one of these is information systems and the use of information.”

The costs of managing information are indirect and spread across the organization (P11). There is a growing understanding that the cost of IT is only a tiny fraction of the cost of managing information. The Vice President IT Services for a US University (P5) said “the people who input the data are the cost.”

The value of information and the benefit of IM seems to be unknown to a number of the participants, due to various reasons. Information loses value due to being commoditized, i.e. it is easy to copy and distribute (F1). The value of information is also contextual (P1, P13). P2 agreed that it would be extremely difficult to measure the value of information and benefit of management initiatives, if not impossible, as “there are so many other things that feed in.”

IAM and its ensuing benefits are intangible. One participant commented that “we are wired as creatures to be very conscious of physical things [...] that’s the way the brain works.” (F4), while F5 gave an example:

“Physical assets are so tangible, you can immediately see them. [...] If someone said, for example, we need to double the size of this room, people would even have a sense of how much that might cost them. In the information business, they can’t.”

The benefits of IAM may not be in cost reduction such as reducing staff alone (P5), although P10 noted that “productivity improvements are not as seductive as cost reductions.”

Once the IAM investment has been justified, the benefits can be significant. The Director IT of a US defence manufacturer (P4) reported:

“Coming back to the \$220,000,000 business case, we are already seeing financial benefits [...]. We’re more efficient, we’re not having all the overhead and we are seeing staff cost reductions through retirement.”

### ***Leadership and management***

Executive managers suffer from a lack of awareness of, and sensitivity to, information as a business asset. This is partly due to the lack of formal education available for directors and managers. A CIO of a transport company (P8) said: “I have just completed my MBA and I learnt about everything – strategy, risk, governance, finance, IT, HR, the works, but not a word spoken about the management of information.” F3 confirmed that when he did an MBA “IT was a part of the curriculum so you wouldn’t look stupid talking to an IT professional”. The Australian Director's courses have an IT component and a Finance component, but there is nothing about managing information (P8). F1 added that managers are further removed from IM the more they move up the management chain.

Day to day information is available but not used for management and decision making and Key Performance Indicators (KPIs) are non-existent (P9). Organizations do not have the discipline required to provide quality information (P1) and “the executive doesn’t take any interest in information management” (P13). “The whole focus is on the tangibles of the business – the hard things that make this business work. It’s getting products to market, getting sales, collecting money, investing money and managing expenses” (P2).

The lack of awareness is manifested in a lack of business governance; no one is held accountable for the effective management of their organization’s IA (F3) and staff are not rewarded for managing information well (F2). Once executive support is secured, IAM can be successful: “Whilst it took a year or something to get the CFO on board, it was fantastic; he was really supportive” (F3).

### ***Strategic outlook***

Because of technologies like the Cloud, IT is becoming a utility. F1 commented: “The bigger risk in the Cloud is disintegration of information; that people are just putting their information somewhere in the Cloud and hope the problem goes away”. As Information Assets are deployed in every business process, it is vital that the CIO aligns IAM initiatives with the strategic imperative of the organization, at both a business level and an ICT level. Sometimes this is difficult at the business level.

“We have not done a good job yet of defining what is our core business. If we can’t define our core business, it’s difficult to define what information is valuable to it”. Yet when IAM initiatives align with strategic objectives, the implications are significant. (P7)

Two themes are emerging from traditional ICT. Organizations are increasingly sourcing their IT strategically to provide flexibility, scalability and cost reductions. Furthermore, managing information strategically can mitigate business risk and drive business productivity and performance.

“The evidence is stacking up that you need to become data driven, information driven. Otherwise you might as well pack up shop because there’s going to be someone smarter, faster and quicker than you that’s going to come along and take away your business.” (P7)

The research indicates that when the focus is removed from the technology and placed on the business, IAM initiatives tend to become successful.

### ***Processes, procedures, work practices and tools***

Managing information as an asset to realize business benefit demands more than installing easy-to-buy-and-implement software. If software is automating inefficient and ineffective processes, poor quality data is simply presented more quickly: “Our technology has improved to the point where I can now receive bad quality data at the speed of light.” The CIO of a local South African city council (P3) added that “one of the things we realized is that business processes are going to either make or break this enormous enterprise and there are very few of local government departments with integrated service delivery business processes that they can measure”.

A CIO (F3) who implemented a successful IAM project in the finance industry indicated that the reason for their success was that the focus was on policy, procedures, workshops, information gathering, communication, understanding the business process, understanding what they required, what they use and don’t use, as well as their human workflow. Only then did they decide how they could improve it with technology.

Organizations do not have the accounting tools to determine time wasted. A law firm is the best place to see this. “We bill in 6 minute intervals and I’m trying to convince the finance guys to put in a code for how much time have I wasted looking for information (F3). If the Accounting profession was able to put a value on intangible assets, those assets would be capitalised, put on the Balance Sheet and scrutinized by every stakeholder from the investment community.

Another issue is that structured data are often managed with technology but unstructured data and knowledge present management challenges:

“Unstructured information is difficult to manage. There are some clever engines [...] but I’ve never really seen anything that produces much of use. It always comes back to the fact that information that’s not captured in a

structured format becomes very difficult to manage. So the technology has not been particularly effective.” (F5)

He added that it is especially difficult to allocate accountability for unstructured data:

“When you get into the less structured data, less obvious data, who’s really accountable for that becomes a bit trickier. But in terms of finance data, for example, HR data, those sort of key data streams, it’s pretty clear who owns those and who’s accountable for them. From the University’s perspective, it’s not their information. That’s not always their view, of course.” (F5)

### **Culture and Behavior**

Behavioral aspects of IM and the culture of an organization significantly influence how well information is managed. Those that encourage safe risk taking are more likely to embrace IAM initiatives. The Director Information Systems Division for a defence manufacturer (P9) referred to “the battlefield is on the inside of this organization [...] No-one is going to do a difficult, nebulous, enterprise wide information management initiative because they are just going to get their head shot off.”

People are afraid of being exposed and “when you’re pointing inefficiencies out to people most will resist (F1, F2). F3 observed that “our organization is slightly schizophrenic in that there’s a group who want to see an investment in information and a group that feels very threatened by information”.

People regard information as power and therefore they are “protecting their patch” as it gives them a position of power (F1). Hoarding information also provides protection against job loss (F4). People also consider company information as their own property and store it on their own hard drives. They also don’t trust the IAM systems and therefore they are sceptical, so they store their information physically two or three times:

“You’re actually saying, I’m going to wrestle these filing drawers out from under your desk and put it in a system that everyone can see and you get enough people that are horrified by that and you don’t get the ‘yes moment’ to go ahead and do it. Because you just get bogged down in the organization.” (F3)

People are basically selfish (F5) and “the direction of the organization is nothing to do with the direction of the individuals” (F4).

The findings of the research are summarized in Table 1 below:

<b>Capabilities</b>	<b>Findings</b>
Understanding the cost, value and business benefit of information and knowledge as business assets	<ul style="list-style-type: none"> <li>• The value of information is difficult to measure Information is intangible.</li> <li>• Information loses value due to being commoditized.</li> <li>• Information is regarded as an individual asset, not a business asset.</li> <li>• Many organizations don’t realize that they are actually in the business of managing information.</li> <li>• Compliance is often the only driver of IAM.</li> </ul>
Leadership and management capability	<ul style="list-style-type: none"> <li>• Executive managers suffer from a lack of awareness of, and sensitivity to, managing information as a business asset.</li> <li>• Lack of business governance; no-one is held accountable for IAM.</li> <li>• Lack of top management support stifles IAM.</li> <li>• IAM is not rewarded</li> </ul>
Strategic capability	<ul style="list-style-type: none"> <li>• Information volumes are increasing exponentially and organizations have to manage their information strategically to drive business productivity.</li> <li>• The IT industry is not strategic in implementing change.</li> </ul>
Capability to implement Processes, procedures, work practices and tools	<ul style="list-style-type: none"> <li>• Poor IAM is costly.</li> <li>• Poor IAM causes rework.</li> <li>• Lack of tools lead to ineffective IAM, especially for unstructured information.</li> </ul>
Capability to influence organizational culture and human	<ul style="list-style-type: none"> <li>• People regard information as power.</li> <li>• It is difficult to determine who owns the information.</li> <li>• People do not care whether they are efficient and there is no incentive to manage information well.</li> </ul>

behavior	<ul style="list-style-type: none"> <li>• People do not want to change the way they manage information.</li> <li>• People resist storing information.</li> <li>• Some companies store too much information.</li> <li>• Information can be used in the wrong way and people are afraid of being exposed.</li> <li>• People are basically selfish.</li> </ul>
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**Table 1: Summary of findings**

## Discussion

To establish IAM capability an organization needs to view data, information and knowledge as an important business asset and manage it as such. Information Assets are the 'lifeblood' of the organization, providing the ability to make business decisions and create competitive advantage. Information is the only asset that is irreplaceable and it therefore has almost infinite value. For example, a university might create competitive advantage based on the ability to retain students, which translates into bottom line profitability, or reduced business risk.

Despite being a critical business asset, research clearly shows that Information Assets are not managed with same level of rigour, diligence and accountability as other vital business assets. Executives are not aware of the importance of IA to their organizations. Due to the lack of tertiary and executive education and time limitations, they are not interested in managing data, information and knowledge as a fundamental contributor to their businesses. Without executive understanding of the cost, value and benefit of information and knowledge, it is difficult to justify investment in IAM initiatives and secure executive support.

The findings indicate that business governance is not applied to IA. Organizations rarely identify who owns, and who is responsible for, vital data, information and knowledge. Nor do they mandate accountability for providing it in an accurate and timely fashion to those who need it to effectively discharge their responsibilities.

IAM decisions need to be made for strategic not operational purposes and initiatives need to be aligned to support the organization's business objectives. IAM initiatives cause a paradigm shift in the organization, which requires strong leadership to be forward thinking enough and actually drive it through. A culture of valuing and sharing information needs to be developed and maintained.

The CIO plays a vital role in effectively managing the organization's data, information and knowledge to mitigate risk, reduce cost and improve business performance. From the research a number of management considerations regarding the role of the CIO in establishing IAM Capability are formulated:

***Management consideration 1:*** *CIOs should understand that data, information and knowledge constitute vital business assets that needs to be managed as such.*

Just as the value of a bottle of wine lies in the content, not in the bottle, Information Assets are more important than their delivery mechanism, namely IT.

***Management consideration 2:*** *CIOs should understand that, whilst the hardware and software infrastructure are critical to delivering the organization's vital information, it has no intrinsic value.*

Every time a report is generated or read, a document is created, an email is sent, an intranet or website is accessed or people have a conversation data, information and knowledge are being managed and used.

***Management consideration 3:*** *CIOs should understand that IA incur a cost, have value and deliver benefit to the organization.*

A true CIO will manage the organization's IA to drive value for the business and avoid engaging in technologies unless it makes business sense and build credibility for the IT profession.



**Management consideration 4:** *CIOs need to create IAM capability through thinking and acting strategically.*

Under the CIO's leadership, executive awareness of the importance of IAM will be developed, business governance identifying ownership and imposing responsibility and accountability will be implemented, executive support will be assured and conditions for success will be created.

**Management consideration 5:** *CIOs need to create IAM capability by convincing, through justification and education, the Board, CEO and executive team that IAM is vital to their organization.*

This will be done through mechanisms including policies, practices, procedures, tools and reward.

**Management consideration 6:** *CIOs can create IAM capability by developing, implementing and maintaining a high performing IAM environment.*

The true CIO creates an environment in which IAM expectations and behaviors are clearly understood, adhered to and rewarded.

**Management consideration 7:** *CIOs can create IAM capability by influencing the organizational culture and the behavior of individual employees to become an 'information and knowledge-focused' organization*

## Conclusion

The CIO is involved in all areas of IAM. Therefore, it is important for the CIO to develop a broad set of capabilities to manage information. Explicitly, CIOs must possess fundamental business domain knowledge to deal with the challenges of the changing environment (Chen and Wu 2011) while understanding the benefits, outcomes and best practices of IAM. We therefore considered the important capability enablers for the CIO in achieving effectiveness in data, information and knowledge management activities. True CIOs have a pivotal role in developing and maintaining the IAM capability of their organizations. Four domains of capability enablers were included in the conceptual framework of IAM Capability.

## Research Limitations

The study is subject to the general limitations associated with this type of field research, particularly regarding generalisation of findings from a limited number of participants.

## Future Research

Future research will investigate the tangible benefits of an IAM Capability, through longitudinal benchmarking. Anecdotal evidence suggests that realisable, tangible benefits are conservatively estimated to be significant. If verifiable through future research, organizations that embrace the management considerations above to develop an IAM Capability will enjoy significant competitive advantage, risk mitigation and business performance improvement.

## References

- Al-Alawi A.I., Al-Marzooqi N.Y. and Mohammed Y.F. 2007. "Organizational Culture and Knowledge Sharing: Critical Success Factors", *Journal of Knowledge Management* (11:2), pp. 22-42.
- Allison D. H. 2010, "The Future CIO: Critical Skills and Competencies, ECAR Research Bulletin", EDUCAUSE Center for Applied Research.
- Australian Institute of Management, 2012. "2012 Australian Management Capability Index", Accessed 19 October 2014, [WWW document] <https://www.aim.com.au/media/default/downloads/ACMI-2012-Full-Report.pdf> (accessed 21 September 2013).
- Banker, R. D., Hu, N., Pavlou, P. A., & Luftman, J. 2011. "CIO reporting structure, strategic positioning, and firm performance", *MIS Quarterly* (35: 2), pp. 487-504.

- Bodnar, J., Jacobi, M., Doucette, E., Bock E., Barr, T., Muskat, J. 2014. "The roles of psychological climate, information management capabilities, and IT support on knowledge-sharing: an MOA perspective", *International Oil Spill Conference Proceedings* (1), pp. 1596-1606.
- Carter, M., Grover, V., & Thatcher, J. B. 2011. "The emerging CIO role of business technology strategist", *MIS Quarterly Executive* (10:1), pp. 19-29.
- Chen, Y. C., & Wu, J. H. 2011. "IT management capability and its impact on the performance of a CIO", *Information & Management* (48:4), pp. 145-156.
- Chun, M. & Mooney, J. 2009. "CIO roles and responsibilities: Twenty-five years of evolution and change", *Information Systems and Technology Management* (46:6), pp. 323-334.
- Davenport, T. H., & Prusak, L. 1997. *Information ecology: Mastering the information and knowledge environment*, Oxford University Press.
- Drucker, P.F. 1988. "The coming of the new organization", *Harvard Business Review* (66), pp. 45-53.
- Earl, M. J., & Feeny, D. 2012. "Is your CIO adding value", *Sloan Management Review* (35:3).
- Enns, H. G., Huff, S. L., & Higgins, C. A. (2000), "CIO lateral influence behaviors: Gaining peers' commitment to strategic information systems", In *Proceedings of the twenty first international conference on Information systems*, Association for Information Systems, pp. 457-460.
- Evans, N. & Price, J. 2012. "Barriers to the Effective Deployment of Information Assets: An Executive Management Perspective", *Interdisciplinary Journal of Information and Knowledge Management (IJIKM)* (7), pp. 177-199.
- Flick, U. 2006. *An Introduction to Qualitative Research*, SAGE Publications, London.
- Galliers, R. D., & Leidner, D. E. (Eds.). (2013), *Strategic information management*, Routledge.
- Heller M. 2007. A Seat at the Table, [WWW document] [http:// www.cio.com](http://www.cio.com) (accessed 23 Oct 2013)
- Kettinger, W. J., Zhang, C., & Marchand, D. A. 2011. "CIO and business executive leadership approaches to establishing company-wide information orientation". *MIS Quarterly Executive* (10:4), pp. 157-174.
- Ladley J. 2009. *Making Enterprise Information Management (EIM) Work for Business: A Guide to Understanding Information as an Asset*, Morgan Kaufmann, New York.
- Lorenzoni, G., & Lipparini, A. 1999. "The leveraging of interfirm relationships as a distinctive organizational capability: a longitudinal study". *Strategic Management Journal* (20:4), pp. 317-338.
- Luftman, J., & Zadeh, H. S. 2011. "Key information technology and management issues 2010-11: an international study", *Journal of Information Technology* (26:3), pp. 193-204.
- Luftman, J., Zadeh, H. S., Derksen, B., Santana, M., Rigoni, E. H., & Huang, Z. D. (2013), "Key information technology and management issues 2012-2013: an international study", *Journal of Information Technology* (28:4), pp. 354-366.
- McFadzean E., Ezingard J. & Birchall D. 2007. "Perception of risk and the strategic impact of existing IT on information security strategy at board level", *Online Information Review* (31:5), pp. 622-660.
- Miles M.B. & Huberman A.M. 1994. *Qualitative Data Analysis*, SAGE Publications, London.
- Mithas, S., Ramasubbu, N., & Sambamurthy, V. 2011, "How Information Management Capability Influences Firm Performance". *MIS Quarterly* (35:1), pp. 237-256.
- Peppard, J. 2007. "The conundrum of IT management", *European Journal of Information Systems* (16:4), pp. 336-345.
- Peppard, J., Edwards, C., & Lambert, R. 2011. "Clarifying the Ambiguous Role of the CIO". *MIS Quarterly Executive* (10:1), pp. 31-44.
- Ponemon L. 2007, "5 things I've Learned, The voice of Experience", [WWW document] <http://www.cio.com> (accessed 23 Oct 2013).
- Preston, D. S., Chen, D. and Leidner, D. E. 2008. "Examining the Antecedents and Consequences of CIO Strategic Decision-Making Authority: An Empirical Study". *Decision Sciences* (39), pp. 605-642.
- Rice, P. L. & Ezzy, D. 1999, *Qualitative Research Methods: A Health Focus*, Oxford University Press, Melbourne, Australia.
- Rodgers, W. & Housel, T.J. 2009, "Measures for organizations Engaged in a Knowledge Economy". *Journal of Intellectual Capital* (10:3), pp. 341-353.

- Sabherwal, R. and Chan, Y.E. 2001. "Alignment between Business and IS Strategies: A study of prospectors, analyzers, and defenders", *Information Systems Research* (12:1), pp. 11–33.
- Strauss A. & Corbin J. 1998, *Basics of Qualitative Research*, Thousand Oaks (CA).
- Swap, W., Leonard, D., Schields, M. & Abrams, L. 2001. "Using Mentoring and Storytelling to Transfer Knowledge on the Workplace", *Journal of Management Information Systems* (18:1), pp. 95-114.
- Tanriverdi, H. 2005. "Information Technology Readiness, Knowledge Management Capability and Performance of Multi business firms", *MIS Quarterly* (29:2), pp. 311-334.
- Willcocks, L.P. & Feeny, D. 2006. "IT outsourcing and core IS capabilities: challenges and lessons at Dupont", *Information Systems Management* (23:1), pp. 49–56.
- Wilson, R.M.S. & Stenson, J.A. 2008. "Valuation of information assets on the balance sheet: The recognition and approaches to the valuation of intangible assets", *Business Information Review* (25), pp. 167.