

The Case for the Chief Data Officer (CDO): Recasting the C-Suite to Leverage your most Valuable Asset

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Overview

Foreword	2
Executive Summary – How to Obtain a Data Advantage	3
1 Introduction – Speaking of Data (Big, Little, Dark ...) in Anticipation of the Impending Tsunami	5
2 Understanding the Current C-level is not Data-Knowledgeable	7
3 Developing Your Organization's Data Leveraging Capabilities	14
4 Focusing DM to meet Common Organizational Challenges	25
5 Creating the Right Conditions for CDO Success	34
6 Conclusions/Suggestions	46
7 Dedication/Authors Bios	48
8 Acknowledgements	48
9 References	49
10 Detailed Table of Contents	52

Foreword

By Cathryne Clay Doss

It's clear that technology is all around us, from your cell phone to your DVR. What we don't think about is the role that data plays. Technology is second nature to us and it's time for data to be the same. To truly tap the value of data we must manage it first, separately from technology.

My first exposure to data was in 1989 and I found myself perplexed when people outside my organization didn't understand the concept of leveraging data to drive better decisions and ultimately increase profits. At that time technology-based data implementations were a novelty. Data was limited in availability and its storage costs were astronomical.

Today everyone talks about data and information based strategies. Technology's incorporation into all manners of business transactions is commonplace. Data is growing exponentially and storage is cheap. However, we continue to be challenged by the fact that the data isn't supporting the business to its fullest extent. Even in those places where the data is supporting the business, acts of heroism are often required to unite disparate data to unearth new business insights. It's difficult to quantify the challenge of disorganized data because strategies to create data architectures, independent from data's encapsulation within business information systems are almost non-existent.

Data materializes from within natural business transactions. It is inherently multi-dimensional. Because business information systems only capture parochially-based subsets of this data, much of its ability to be subsequently recast into different forms and uses is forever lost. Because of this business information system centric strategy, we continue to have suboptimal, single/restricted-use data that cannot be advantaged for the business.

If systems are built to support the business processes, shouldn't there also be systems that capture business data within its natural business-transaction contexts as well? If so, then Data Management's role is to enable the successful architecture, engineering, capture, storage, and ability to leverage business data to drive better decisions and ultimately increase profits.

While the journey to well-managed data and ultimately the use data to achieve a business's strategic advantage is long, it all starts with an organization's recognition of the independence of data from its encapsulation within business information system centric processes.

Data needs the same dedicated focus that technology has enjoyed if we truly want it to achieve its full potential. Now is the time to embrace the next generation in the data journey that must be focused on how to best manage that abundance of data and put it to work for the business.

The authors have dedicated their careers to educating themselves and others on best-in-class data management practices and through that work has a clear line of sight on how to ensure that the 21st century makes the most of this amazing asset. Peter Aiken and Michael Gorman have joined forces to describe the data challenges that most of us see but struggle to articulate, much less solve. I am hoping that all of you will see that these problems really exist and this book gives you the solution, which now in retrospect seems so simple. So, I challenge each of you, what will you do differently tomorrow with the information you will learn today?

Cathryne Clay Doss was Chief Data Officer of CapitalOne from January 2002 to December 2005. No one has challenged the claim that she was the first appointed CDO or that CapitalOne's CDO played a key role in its successful Information-based Business Strategy (IBS).

Executive Summary – How to Obtain a Data Advantage

Data are an organization's sole, non-depletable, non-degrading, durable asset. This book makes the case for dedicating an individual to leverage them as assets – a Chief Data Officer or CDO. Only thru a proficient individual:

1. Dedicated solely to data asset leveraging,
2. Unconstrained by an IT project mindset, and
3. Reporting directly to the business

can organizations expect to leverage their data assets. Data possesses properties worthy of additional investment. Many existing CDOs¹ are fatally crippled, lacking one or more of these necessary pillars. Often organizations have some or all components already in place but not operating in a coordinated manner. By the end of the book, you will understand these pillars, why each is necessary (but insufficient), and what do to about it. Briefly this book covers:

1. **Engineering our organizations to deal with the impending data tsunami.**

Data and its use are becoming increasingly important to your organization. If you haven't already heard of **big** data and how it is 'transforming' your world, you will soon. Data's importance and scale continues to increase at an exponential rate. Difficult as it is to manage now, data management (DM) is going to get much more difficult, very quickly, based just on the forecast volume and dimensionality increases. In the face of this onslaught, we must transform our concept of DM and organizational processing: from part of IT, to supporting an organization engineered to leverage its data and surf the tsunami.

2. **More than likely, you, your IT leadership, your organizational knowledge workers have not had opportunity to acquire the requisite knowledge, skills, and abilities (KSAs) to strategically leverage data as an asset.**

Yet you are still responsible for well-managed data. You are all smart individuals who have proven capabilities, mastering technological change. You were never asked to learn about data and so didn't learn much about it. As a result, less than 10% possess the KSAs required to successfully leverage data assets [representing IP equal to half of organizational valuations (Olavsrud 2012)]. The other 90% are not data-knowledgeable.² Once the CDO/IT/non-IT knowledge workers are tasked, educated, and organized to leverage data, the organization's performance will propel it to the head of its peer group.

3. **(Until reading this) You may have been unaware that your IT leadership likely does not possess these KSAs.**

You likely think of data as a part of IT. If you investigate, you will be surprised at kind

¹ Our 2013 survey research indicated that 70% of current CDO positions had existed for less than one year, 19% had existed for 1-3 years, and 8% for 3-5 years.

² We did not use the term "data-literate" as this is a much lower standard.

of time and type of attention that data gets. Fueling IT operations, data inputs and outputs must be exactly matched at the most atomic level in order to be useful. Your organization is probably spending much time, resources, and effort managing differing data requirements requiring inordinate transformation efforts. This constrains operations and saps resources – mainly from data analysis. Organizations made aware of these situations, rapidly reconfigure and take advantage of these new capabilities.

4. **Your IT leadership is similarly unaware.**

Your IT leadership attended appropriate training/college and learned what they were taught. The subject of DM is virtually never introduced. Most encountered data only in a class devoted to database management system development. Having learned what they were asked to learn, IT leaders acquired a technology-centric view of data and are largely unaware of the need for architecture/engineering-based DM KSAs. Not being data-knowledgeable, they cannot be good decision-makers about data. When these circumstances improve, it is possible to calculate the ROI obtained from data leveraging and incorporate it as a strategic organizational capability.

5. **Your organization is likely unprepared to obtain a big data advantage.**

Because of the above, your organization lacks repeatable processes for being able to successfully use data assets to support organizational strategy. Your data related activities are costing more, taking longer, and delivering less – your operations are similarly brittle. You are unaware of this and your organization is not taking steps to address it. Organizations making these changes are able to incorporate new technological capabilities into their overall architecture and obtain data advantages more quickly.

6. **Unless you dedicate an individual to leveraging data assets, your organization will continue be unable to obtain a data advantage.**

To address this challenge, name someone to be your data Chief – most are calling it a Chief Data Officer (CDO). Provide them with the necessary success pillars.

First, sole dedication to data. Fractional approaches have not worked to date – this is a full time effort. A committed focus to data-centric development (see Section 3.5) facilitates C-level data asset awareness.

Second, de-linking data asset evolution from system development permits your architects to develop the necessary evolutionary, strategic mindset toward data.

Third, this position must report up to the executive leadership. It is really a question of bandwidth. IT management cannot devote the requisite time/resources and is not-data knowledgeable. Freeing the CDO from the IT reporting chain results in faster organizational transformation and permits increased agility.

'Working' from this perspective for at least a year, the CDO will understand your organizational data challenge – a prerequisite to data-knowledgeable decision-making (see our job description for the position included as Section 5.3.5).

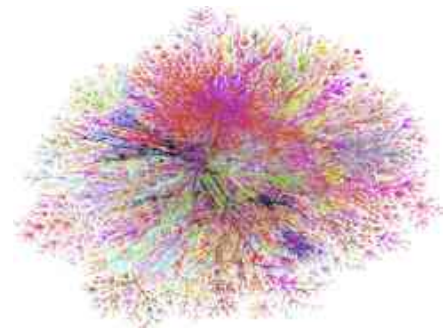
1 Introduction – Speaking of Data (Big, Little, Dark ...) in Anticipation of the Impending Tsunami

As this book was being completed (2013, Q1), the Gartner Group estimated that 'big data' was 2-5 years away from peak hype. Their widely watched, reported, and adopted forecast indicated that buzz around the concept of "big data" would be increasing the near future. If you have not heard the hype – you will.

We are not going to bore you by re-creating a bunch of statistics showing that data creation, data processing, and data understanding requirements are increasing at increasing rates. Just consider the widely cited fact that AT&T mobile traffic increased 8,000% between the years 2007-2010 or Eric Schmidt's often repeated comment that, "Every 2 days we create as much information as we did up to 2003." It is sufficient to say that the number of things that produces data is rapidly growing. For example, 1 billion smart phones were in use in 2012. It should take only three more years to double to 2 billion (Brown 2012). Increasingly, individuals make use of the thing's (smart phone/tablet/sensor, etc.) data producing capabilities. It all adds up to a number of challenges that are referred to as "big data."³

While it has so far proven impossible to define data as 'big,' it is possible to objectively categorize big data techniques, which are what have really been responsible for the so-called big data successes.⁴

Figure 1 It is not possible to define big data (but there are a lot of depictions)



When considering data issues, a minority of decision-makers possess the required KSAs/background – they are not data-knowledgeable. Poor understanding of how to successfully leverage data prevents organization from obtaining a data advantage by making poor decisions about data, its management, and how it is shared.

We have crystalized the reasons that have prevented most organizations from obtaining a data advantage. We advocate a CDO, responsible solely for organizational data assets. Through the CDO's perspective the organization will understand what size and

³ Truth be told, there cannot be any such thing as big data. First – all other data would then have to be labeled "small" or "medium." We are now left with the challenge of using vocabulary such as "dark" to refer to legacy data. Second, because no one has come up with an objective definition for "big data" – it is impossible to separate out any specific causes and effects to study. Any measurements, claims of success, quantifications, etc. attributable to big data must be viewed with appropriate skepticism.

⁴ Appropriate processing trade-offs such as eliminating the von Neumann processing bottleneck, taking advantage of continuous availability; or eliminating human limitations – can be objectively evaluated along with other advances for potential organizational utility – as all proposed capabilities should be evaluated. If your organization suspects that it might be able to benefit from the application of big data techniques, or has already embarked on this journey, this is material is a must read!

shape data challenge it is facing. Only then will the organization be able to make decisions about data using the appropriate context and understanding. We'll describe how the CDO should get started on this daunting task.

This book's contents can be visualized with the aid of Figure 2 – a word cloud of the text.⁵ Sequentially, the next section describes the Chief Information Officer (CIO) function as having to broad a technology management to focus enough resources on data issues. The 3rd details, 'exploiting a data advantage' and how the CDO function provides much needed relief for broadly focused CIOs, who are ill prepared to devote requisite time and attention. Section 4 presents measurements showing how organizations are not ready to leverage their data assets and what must be done to correct this. The 5th examines the causes for this poor DM practice maturity and suggests remediation. Section 6 argues that the remedy starts with a properly supported CDO as a business capability reporting outside of IT. Section 7 sums up and provides some implementation guidance. Organizations can soon be in a position to take advantage of the promise of big data techniques as well as more mundane DM benefits such as more effective/efficient operations.



Figure 2 Wordle(.net) of this text

⁵ That the word cloud isn't on this book's back cover is evidence of still significant technology understanding gaps in the industry.

2 Understanding the Current C-level is not Data-Knowledgeable

2.1 CHAPTER OVERVIEW

We describe the reasons that C-level executives are not data-knowledgeable. To understand the challenge, it is important to understand leadership and symbolism requirements accruing to chief officer positions, as well as a needed technology management focus, and highlight the varied backgrounds brought to IT chiefs.

2.2 WHO IS YOUR DATA CHIEF?

If you picked up this book and thought to yourself:

Hmm – isn't the CIO the top data job?

Then you are exactly the person we are trying to reach. The short answer is:

Not in today's IT!

Before launching into what some have already viewed as a critique of the CIO function, it is important we state that CIOs have accomplished astounding feats, developed excellent organizational skill sets, and delivered tangible business value. In the process, we've learned a great deal about using technology to obtain a strategic advantage.⁶ CIOs have our tremendous respect for the amazing results delivered by the organizations they oversee, the differing approaches to IT management, and reward systems (Wailgum 2009).

As a group, they have proven themselves astoundingly capable and quite adept at addressing organizational challenges – often by incorporating new technologies (clouds, analytics, service architectures, etc.) into complex environments. With rapid technology advancement, slow learners quickly fall behind and those who survive as successful CIOs have achieved extraordinary successes. But those who are successful as still largely not data-knowledgeable of the foundational role data plays in IT. Most organizations suffer from poor DM and a small but measureable number (less than 10%) think the approach we have outlined below is just common sense. An early reviewer of this book stated:

I have worked with very senior, very talented CIOs. These folks fundamentally understand data – the complexity, multi-dimensional behavior and systemic flow of data. They understand the consequences of not delivering data to key operations. They understand the importance of data around operational risk and risk reporting. So it's not a knowledge issue – I believe it's a focus and attention issue.

⁶ Unfortunately, from a learning/improvement perspective, it has been difficult to extrapolate lessons from their successes beyond case studies and surveys. Noted research (see Huff 2009 – two citations) has relied upon vagaries such as "the existence of a system" to assume capabilities, an unwise assumption given what we know of system data quality (see English 2009).

We have to respectfully disagree with the reviewer.⁷ Our combined 80 + year experiences⁸ with more than 500 organizational DM practices indicate that 90 (+) percent of CIOs are not data-knowledgeable. The data-knowledgeable 10% are inevitably surprised to learn they comprise such a small minority. As a group, CIOs have not managed to:

Manage data as an organizational asset in an attempt to obtain a strategic data advantage!

Data are an organization's sole non-depletable, non-degrading, durable, strategic asset. You can't use it up. If properly maintained, it cannot degrade over time or from use. It is by accounting definitions, durable – persisting beyond the one-year yardstick. Data's value increases as it evolves along the value chain. From business predications, it becomes transactions, and ultimately returns full cycle – the basis for future predications. So far we have failed to acknowledge data's primary potential value – factual information, fit for use, describing the organization's operations/environment and improving decision-making. Combined these make data unique as assets in the organizational repertoire.

Data are assets that deserve to be managed as professionally and aggressively as other company assets. Objective measurements show that few organizations achieve DM success and are able to exploit a strategic data advantage (see Section 3.4). In the face of the ongoing 'data explosion,' this leaves most organizations unprepared to leverage their data assets.

Returning to our title ...

If the CIO isn't the top organizational data job then what is?

The answer is that much of the care and feeding of data assets occurs at the technical level – if at all. CIOs/IT leaders and knowledge workers in general have little education/training in, and thus do not possess the requisite KSAs to make decisions about organizational data. Being not data-knowledgeable, collectively, they don't know what they don't know. What knowledge they have has been acquired on the job and, since data can occupy only a fraction of their focus, not much OJT has taken place.⁹

2.3 CHIEF OFFICERS

[The definition for chief is: "the head or leader of an organized body of people; the person highest in authority: the chief of police.] dictionary.com

Organizations have recognized the need for individuals to be knowledgeable and accountable for important organizational assets and functions. Figure 3 is a (Wikipedia) list of 58 commonly used organizational titles beginning with the word 'chief.'

⁷ Our guess would be that the nature of the reviewer's job attracted top-caliber colleagues.

⁸ As of publication, Q1 Aiken has 30 years in the business – Gorman 50.

⁹ Perhaps not surprisingly, knowledge workers tend to be more data knowledgeable – perhaps given that they work with it more consistently.

Chief Accounting Officer, Chief Administrative Officer, Chief Analytics Officer, Chief Audit Officer, Chief Brand Officer, Chief Business Officer, Chief Channel Officer, Chief Commercial Officer, Chief Communications Officer, Chief Compliance Officer, Chief Creative Officer, Chief Data Officer, Chief Executive Officer, Chief Financial Officer, Chief Human Resources Officer, **Chief Information Officer**, Chief Information Security Officer, Chief Innovation Officer, Chief Investment Officer, Chief Immigration Officer, Chief Geospatial Information Officer, Chief Knowledge Officer, Chief Leadership Officer, Chief Learning Officer, Chief Legal Officer, Chief Marketing Officer, Chief Marketing Information Officer, Chief Medical Officer, Chief Merchandising Officer, Chief Networking Officer, Chief Operating Officer, Chief Process Officer, Chief Procurement Officer, Chief Product Officer, Chief Research Information Officer, Chief Risk Officer, Chief Science Officer, Chief Stores Officer, Chief Strategy Officer, Chief Technology Officer, Chief Visionary Officer, Chief Web Officer

Figure 3: Fifty-eight, commonly used chief officer titles (more exist)

The organizational expectation¹⁰ is that the individual holding the title is the most knowledgeable executive in the organization and is responsible for the organizational asset referenced by their title. The Chief Financial Officer (CFO) is the individual possessing the KSAs to be both the final authority and decision-maker in organizational financial matters. The Chief Risk Officer (CRO) is the individual possessing the KSAs makes decisions and implements risk management. The Chief Medical Officer (CMO) is responsible for organizational medical matters. (The list continues ...) The organization, and the public, has similar expectations for any of chief officer.

2.4 THE BROAD TECHNOLOGY FOCUS OF MOST CIOs

The first uses for computing technology were to automate existing manual processing – making existing processes faster. As well articulated:

Fifty years ago, data management was simple. Data processing meant running millions of punched cards through banks of sorting, collating and tabulating machines, with the results being printed on paper or punched onto still more cards. And data management meant physically storing and hauling around all those punched cards (Hayes 2002).

Tasks such as check signing, calculating, and machine control were implemented to provide support for departmental-based processing. Early on, there was no industry-wide approach to data processing systems development. The systems were the product of the creative minds and spirited individuals within departments (i.e., Personnel, Payroll, Inventory, Manufacturing, etc.). Each functional unit of the organization developed its own, siloed, data processing systems and data (see Figure 4).

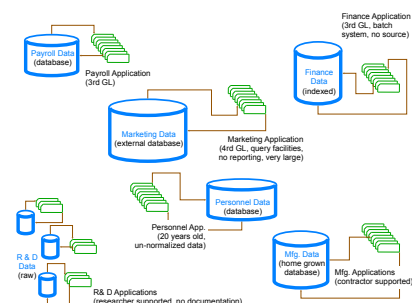


Figure 4 Typical organizational systems evolution resulted in application and data silos

¹⁰ For the finance domain, this is a mandate – the U.S. Sarbanes–Oxley Act of 2002, enacted in the aftermath accounting scandals, requires at least one member of a public company's audit committee to have financial expertise (Congress 2002).

These siloed systems worked well in isolation but requests for integrated data require significant additional development to accomplish the integration and large quantities of additional processing to achieve it. The description of the upward theoretical complexity required to integrate N siloed systems is:

$$(N * (N - 1)) / 2$$

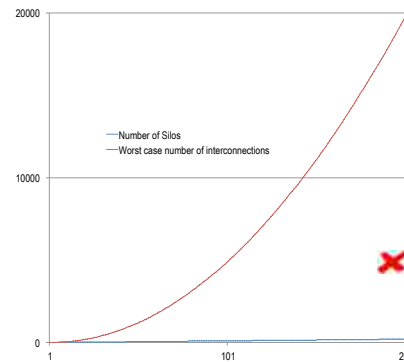


Figure 5 The rapidly increasing cost of complexity

Figure 5 graphs this function to illustrate the steep rate of increase in the quantity of integration-only based systems that need to be created. (In some environments, ETL comprise much of this class of systems.) To completely integrate the six systems shown in Figure 4, 15 different data interface systems need to be created to connect everything to everything using point-to-point interface solutions.¹¹ The red X on Figure 5 signifies the complexity point a large bank calculated as it managed 5,000 interfaces among 200 major function-based siloes. These numbers and complexity levels pervade all types of organizations and have held steady across decades – in spite of the advent of the ERP, SAAS, SOA, cloud, MDM or any other technology-based buzzword.

Each data interface becomes a data processing system in its own right (ETL, for example, comprises a major category of small systems). If you start with six silo-based systems, and add the 15 data interface systems, you end up with 22 systems required to provide point-to-point connections among six siloes.

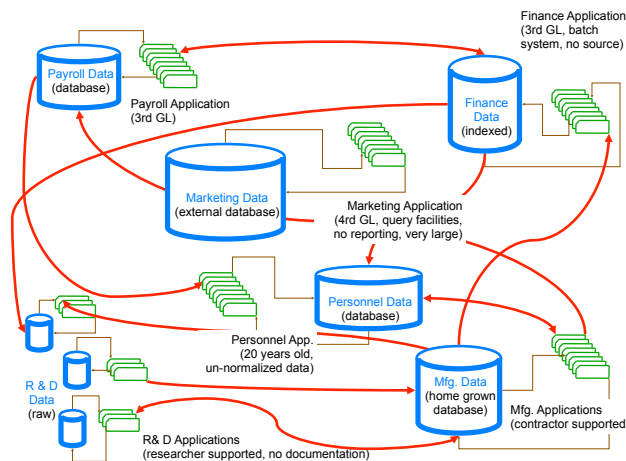


Figure 6 Typical organizational systems evolution

As you can see from Figure 6 more than a few interfaces and the costs of point-to-point connectivity among siloes far outweigh their primary advantage – the solution implementation speed. When managing too much complexity, an organization’s IT (and general) productivity decelerates. The more programmatically data interfaces can be managed, the lower IT’s costs become.

Eventually, these arrangements required an individual-in-charge – a position that has evolved into the 'Chief Information Officer,' who is seen as responsible for all things technology.

Wikipedia as defines a CIO as:

¹¹ Six sources, if you count R&D as one big system. For that to occur the same integration must be accomplished within R&D. If not, then N rises to 8 – now requiring 28 interfaces for maximum connectivity!

- The chief information officer (CIO), or information technology (IT) director, is a job title commonly given to the most senior executive in an organization responsible for the information technology and computer systems that support organization goals (Wikipedia 2012) .

According to another definition, the CIO, is:

- The executive officer in charge of information processing in an organization. All systems design, development and datacenter operations fall under CIO jurisdiction (Encyclopedia 2013).

This makes both makes intuitive sense and also simultaneously accounts for much of the misconception. If CIOs manage the information technology, then it seems natural that they must also manage the information. Analysis shows (see Section 4.4) show this not to be true. Complicating further, is a lack of uniform CIO qualifications/preparation.

2.5 CIO PREPARATION – AGREEING ON UNIFORM QUALIFICATIONS

There is a general belief that the average CIO tenure is from 18 months to two years (Marks 2011). A search for 'CIO tenure' reveals a more diffuse picture. Recently, unsubstantiated evidence has been introduced indicating that CIO tenure is approaching 4.5 years. In contrast, the information that the tenure of CFOs appears to have increased to almost 12 years in the year 2010 is easily obtained from the web (WEBCPA 2010). Some of this stability can be explained by a singular task focus.

CFOs have uniform prerequisite skills, certifications, and educational accomplishments. Professional organizations and recognized best practices uniformly dictate non-controversial KSAs. The Chief Financial Officer (CFO) commonly possesses a Certified Public Accountant (CPA), a Masters degree in Accounting, a Certified Management Accountant (CMA), an MBA, other recognized degrees/certifications, or at least a strong accounting background (Congress 2002). These are, widely recognized as necessary but insufficient prerequisites/qualifications and, applauded.



Figure 7 CIOs varying backgrounds [from (McCafferty 2011)].

CIO backgrounds have much variety. A strong IT knowledge has been seen to be a big "plus" – with the other "plus" being organizational experience. While the lack of a "Qualifications Section" in Wikipedia is hardly proof, there is very little agreement on what is an appropriate background for a CIO. Popular CIO backgrounds include operations, finance, and sales/marketing (see Figure 7). Wikipedia continues, "recently CIOs' leadership capabilities, business acumen

and strategic perspectives have taken precedence over technical skills. It is now quite common for CIOs to be appointed from the business side of the organization, especially if they have project management skills" (Wikipedia 2012).

CIOs come from a variety of backgrounds and are expected to master a wide variety of technologies as well as oversee a variety of technical functions. Despite a lack of formal, comprehensive, certifications and educational accomplishments, the CIO is the business executive upon whom is placed the requirement for the broadest skill set!

These required skills include [from (Curran 2009)]:

- Leadership abilities;
- Hands-on technology background;
- Experience in leading large change programs;
- Experience in running successful IT infrastructure operations;
- Management experience in a non-IT function;
- Innovative thinking that can solve relevant industry and business issues; and
- The ability to understand how projects and operations impact corporate financials.

Finding these in a single individual has been a challenge. A quote well describing the current situation comes from a former CIO colleague:

Advisors have been pontificating on the evolution of the CIO role towards CPO – Chief Process Officer. So now the CIO would own all technology, all processes and all data. No other organization is experiencing this evolution into other spheres of influence. The CHRO does HR work. The CFO does financial work. The COO does operations work. However, the CIO is expected to be the head of technology, the architect of all business processes and the intelligence behind leveraging data.

Most CIO's today are challenged with being 'experts' on technology (infrastructure and application), business process, relationship management and data management).

None are successful at all and most have a bent towards only one of those areas, depending upon where they began their career and the path they took to attain their CIO role (Giuffrida 2011).

The management of data as an asset has almost never been seen as a significant CIO skill or job qualification requirement. Outside of previously referenced specialty programs, there are not many places that an aspiring IT executive would even encounter DM as topic of study. Smart, anxious-to-learn individuals, study, preparing for IT leadership – primarily through graduate curricula. They take classes and learn what we teach them.

A typical computer science/information/systems/ computer engineering degree includes just one course focusing on data. That course typically focuses on the HOW's of building a database using Oracle, MS-Access/SQL Server, or an open source project.¹² A typical business graduate might be exposed to MS-Access. Since DM is not a formal part of the curricula, they explicitly learn that DM is not part of what IT leaders do. Since DM was not part of their education, it doesn't become part of their IT management purview. This technology focus provides the average IT worker with very little practical knowledge of how to best leverage data assets. As a result, very few IT or business professionals are data-knowledgeable.

¹² Since a very small percentage of data management time is devoted to building new databases, one could make a very strong case for evolving the content of the "data course" to something more useful for future IT professionals.

In summary, while some C-level positions benefit from uniformly mandated knowledge, skills and abilities, the CIO function lacking these consistent qualifications. Consistently, the CIO function has been not data-knowledgeable – there has been a lack of explicit, reliable and repeatable knowledge of how to leverage data assets. Because of the long-term planning required to obtain significant ROI, this results in IT leadership not considering various planning tradeoffs and making poor data decisions.

2.6 WHAT ARE THE CIO FUNCTION CHALLENGES AS CURRENTLY PRACTICED?

Because IT is complicated, organizations often find it more effective to concentrate technical skills in fewer specialists instead of teaching all knowledge workers to (for example) manage servers. IT attempts to create IT-leverage, using a few knowledgeable specialists that provide services to all. However, unlike most Chief Officers, who have real authority over their function area, e.g., CFO has real authority over finances, CIOs are generally:

- Not the ultimate authority on informational assets;
- Not able to devote the required time/attention to manage these assets;
- Not possessed of the requisite expertise to make good data decisions; and
- Not situated to achieve organizational data success from their technology/application-centric perspective.

Using the above criteria, few current CIOs qualify as data-knowledgeable.¹³ Being not data-knowledgeable and using the title, these CIOs are unintentionally misleading their organization in two ways:

1. They are misleading them into thinking the CIO has focused requisite attention on leveraging the organization's data assets; and
2. That the CIO has the requisite KSAs and is capable of making good data decisions.

Our educational and professional support systems have left this 90% CIO group – not data-knowledgeable. Section 4.4 shows that the CIO agenda so overwhelmed that to divert resources to data management would literally force something else to be dropped – an impossibility for most. Only a fraction of these busy executives have reallocated options that don't hurt other responsibilities. This serious structural gap exists in most organizations and is a root-cause of many IT challenges.

2.7 CHAPTER SUMMARY

We presented the 'Chief Officer' function and the surrounding expectations, background, and preparations. We explained why today's CIO is unlikely to be data-knowledgeable due to the lack of organizational DM visibility in educational/professional curricula. This has led to other problems impacting organizational IT success. We must remove the pressure on whoever serves as the technology Chief by creating a data Chief.

¹³ In many instances, addressing this challenge is as simple as reading the DM BoK!