5 MODELS FOR DATA STEWARDSHIP

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# Table of Contents

**Introduction** ........................................................................................................... 4

**The Problem with Data Stewardship** ................................................................. 5

**Gauging Data Stewardship Models** ................................................................. 7

**5 Models for Data Stewardship** ........................................................................ 8

- Model 1: Data Steward by Subject Area .......................................................... 8
- Model 2: Data Steward by Function ................................................................. 10
- Model 3: Data Steward by Business Process ............................................... 12
- Model 4: Data Steward by Systems ................................................................. 14
- Model 5: Data Steward by Project ................................................................. 16

**Data Stewardship on the Ground** ................................................................. 18

- Challenges in Deployment ............................................................................. 18
- Before You Begin ............................................................................................ 19

**A Day in the Life** ............................................................................................. 21

**Conclusion** ...................................................................................................... 23
Data stewardship is seen as the glue that binds heterogeneous information.

INTRODUCTION

Former Intel CEO Andy Grove once coined the phrase, “Technology happens.” As true as Grove’s pat aphorism has become, it’s not always good news. Twenty years ago, no one ever got fired for buying IBM. In the heyday of customer relationship management (CRM), companies bought first and asked questions later. Nowadays, executives are being enlightened by the promise of big data technologies and the role data plays in the fact-based enterprise. Leaders in business and IT alike are waking up to the reality that – despite the hype around platforms and processing speeds – their companies have failed to establish sustained processes and skills around data.

A technology’s success or failure is not proportional to the existence of an executive sponsor, solid requirements, or even a deliberately crafted business case. Instead it depends on the existence of rigorous processes and dedicated skills to implement and maintain it. When it comes to the aforementioned solutions, data stewardship is seen as the glue that binds heterogeneous information – ensuring common, meaningful data across applications and systems. It seems obvious that data stewardship is important to the business. However, is it really a critical success factor?
5 Models for Data Stewardship

THE PROBLEM

with data stewardship

When clients talk to us about introducing the role of data steward in their organizations, data stewardship is often considered a proxy for broader cultural and ownership issues. Here’s a synopsis of a conversation with the director of marketing analytics at a consumer goods firm that illustrates this point.

**SAS Best Practices:** “So can you describe the problems that are driving the need for data stewardship?”

**Director:** “Well, it’s pretty clear we’re at the point now where we need someone to own the data.”

**SAS Best Practices:** “And what data is that?”

**Director:** “All the marketing data.”

**SAS Best Practices:** “What are the boundaries with the data?”

**Director:** “Boundaries? All customers, products and financials. Oh, and store locations. In a word: big data. Well, OK, that’s two words.”

**SAS Best Practices:** “Hmmm. You mention ownership. If you had a single data owner, how would that help?”

**Director:** “He’d own the data so he could tell us what to do with it and the processes to put in place. He’d also define it all for us, and tell us where to keep it. We have no one to do that now.”

**SAS Best Practices:** “And how do you see this new resource spending his time?”

**Director:** “Spending his time?”

**SAS Best Practices:** “Yes. Tactically.”

**Director:** “We’d need you guys to tell us that.”

**SAS Best Practices:** “OK. But would there be an initial project or data set that the data steward could focus on so that we can design the role and the accompanying processes to prove value?”

**Director:** “Yes. The project would be to socialize the understanding of data stewardship.”
In chaotic environments with highly distributed systems and projects, data stewardship promises a central point of contact for increasingly complex and growing data volumes. In companies where roles are vague, data stewardship assigns decision rights around data – enforcing accountability. In very political environments, data stewardship holds the promise of more turf ownership and more visibility.

In these cases, data stewards are often assigned hastily without much vetting or focus and are just as quickly rendered inert by organizational maneuvering and land-grabbing. Whether they exist in the business or in IT, data stewards become roving linebackers, going from meeting to meeting with no real authority to resolve data quality problems or enhance metadata management capabilities. Many data stewards are rendered mere figureheads in their organizations, with few constituents understanding their responsibilities. The term “data steward” is eventually met with shrugs and rolled eyes and is all too often marginalized as just another indistinct IT function.

Indeed, the promise of data stewardship is the inherent problem with data stewardship: it’s not specific enough. In fact, the well-worn industry precepts for data stewardship have been largely to blame for the increasing disillusionment and confusion about the role. You’ve probably heard some of them:

- Data stewardship is a business function, not an IT function.
- Data stewardship requires enterprise data governance.
- Data stewards define and maintain data.
- Data stewards are subject area experts.
- Everybody is a data steward.

Companies that don’t struggle with situations like the one above often have data stewardship programs that are wildly successful. How did they do it? In our work with clients to formalize the role of the data steward, we’ve realized there’s no such thing as “one size fits all.” Indeed, some of the most effective data stewardship programs we’ve seen have bucked popular dogma and started in IT. The truth is that how you begin data stewardship depends on where you are now.
When considering launching data stewardship, companies should consider a range of factors, including:

**Existing data-centric skills.** Are data skills tied to systems? Are they tied to individual implementation efforts? Are there data modelers or DBAs who know data and who are available for different projects? Answers to these questions can determine not only what the data steward initially does, but the reporting structure.

**Company culture.** Cultures of anarchy, cultures of management edict and everything in between exist within companies. The ability to work within a culture while slowly driving awareness and change is the hallmark of an effective data steward.

**Reputation of data.** If poor data quality is a corporate assumption, this may easily establish the data steward’s initial area of focus. But data stewardship is bigger than just data correction, so meeting the company’s needs may mean starting elsewhere.

**Current view of data ownership.** Many executives acknowledge that the business owns the data. Yet upon closer inspection, business people have little, if any, responsibility to define, manage, track, improve or enhance the information they use.

**Understanding of measures.** Even the least data-savvy organization may nevertheless have a measurement-based culture. Many companies that have adopted total quality management (TQM) or Six Sigma initiatives can apply them to data improvements, not to mention data steward productivity tracking.

**Reuse of data.** When data is shared, there are natural economies of scale. There are also natural conflicts. The rate of data stewardship adoption is proportional to the need for data reuse.
5 MODELS for data stewardship

As we’ve worked with clients to formalize data governance programs and to institute data management best practices, we have formulated five primary models for data stewardship. Each is unique, with its own benefits and risks. Each represents a deliberate approach to launching a data stewardship program that can meet the company where it is today.

Model 1: Data Steward by Subject Area

In Model 1, each data steward owns and manages a discrete data subject area. So the customer data steward is different from the product data steward, and so on, as illustrated in Figure 1:

Figure 1 shows that a corporate governance process may drive both IT governance and data governance policies and decision making. For instance, if risk management is part of a firm’s corporate governance framework, that might include the dictate, “Ensure customer privacy.” The resulting governance edict can affect IT governance in the form of system and application security policies. And it can affect how customer data is protected, driving decisions about data access and protection.
The data governance process will involve data stewards (who are participants), but ultimately data stewards will be directly accountable for the success of the management of their data domains.

In complex or very large environments, there can be more than one data steward for each subject area. Depending on the scope and definition of the subject area, data stewardship may be further broken down into multiple domains – each with an individual data steward. For instance, a “party” data domain may be broken down into customer, prospect and supplier domains. One or several data stewards may be assigned to each domain depending on the size and complexity of the data contained therein and the breadth of its usage. This approach typically works best in medium- to large-sized companies with multiple departments sharing the same data.

The benefits of a data-subject-area-oriented stewardship model include:

- Ownership boundaries that are usually clear.
- The data steward's knowledge of the accompanying business rules and usage environments for her data subject area are likely to increase over time.

Model 1 data stewardship is often easy to pitch: We need someone to own customer data. Most business people would agree.

The risks of data subject area stewardship include:

- Measuring the data steward usually focuses on data quality improvements at the expense of broader business benefits like customer retention or consolidated item master.
- The potential size and scope of a given data domain – across multiple organizations, processes and business applications – may make finding qualified data stewards challenging. Likewise, there may be people in the organization who refuse to cede control over an entire subject area to an individual role. Subject area data stewardship can be fraught with political landmines.
- It can be difficult to tie the data steward to actual business initiatives since the data steward can only be as effective as the business initiatives he supports. Therefore, Model 1 data stewardship calls for tested relationship-building skills.
Functional data stewardship focuses on the individual department or line of business using the data.

Model 2: Data Steward by Function

Functional data stewardship, also known as organizational data stewardship, focuses on the individual department or line of business using the data, as shown in Figure 2:

Figure 2: Model 2: Functional (Organizational) Data Steward
In this model, the data steward focuses on the data that a given organization or organizational function – in this case, the marketing department – uses. This can include customer data, campaign and promotions data, customer value and risk scores, and third-party data. It could also encompass product and financial data. Depending on the scope of the organization, there may be other data stewards for each subject area, in effect representing a “hybrid” of Models 1 and 2.

The benefits of a functional data stewardship model include:

- A data steward’s scope that is bounded by the organization, which makes it easier for the data steward to establish definitions and rules, and mitigates the need for complex workflow.
- Greater likelihood that a data steward from within an organization will be business-savvy and familiar with the data’s context of usage.
- Functional data stewards that are naturally affiliated with business objectives of their departments, making it easier to delineate and socialize responsibilities.
- A data steward who is likely to know the business users of the data and may even have worked side by side with them, minimizing user engagement challenges.

The risks of functional data stewardship include:

- In immature or political environments, multiple data stewards in different departments may be managing and manipulating the same data. This results in duplication of effort. Worse, it can mean conflicting policies and definitions, with people redoing or undoing each other’s work.
- The nature of this model means that data stewards are rarely motivated to collaborate with their peers across functional boundaries, thereby creating conflicting or redundant data silos.
- Functional data stewardship won’t work in companies that have prioritized enterprise-class “single view” initiatives or consolidation programs. It requires strong differentiation in terms of rules, processes and procedures within individual departments, especially those that are not tied together at the corporate or fiscal level. For this reason, it requires a solid data governance environment.
Model 3 is very effective for companies that have a solid sense of their enterprise-level processes.

Model 3: Data Steward by Business Process

In Model 3, a data steward is assigned to a business process. This model is very effective for companies that have a solid sense of their enterprise-level processes and understand that process begets data, and vice versa.

As Figure 3 illustrates, data stewardship responsibility is assigned for discrete business processes. In this case, data stewards may be responsible for multiple data domains or application/systems that participate in a given business process. One or several data stewards may be assigned to each process based on its complexity or scope. For instance, a large high-tech firm we worked with had devised an enterprise-level “quote-to-cash” business process that enlisted several full-time data stewards.

A common hybrid of this model is a process-business-by-function combination in which each business unit that has a stake in a given process has a data steward assigned to it. In this scenario, each process has multiple data stewards and a steward for a given business function may also represent multiple processes.
The benefits of process-oriented data stewardship include:

- Companies become very comfortable circumscribing their business processes. Data stewardship is therefore seen as a natural extension of process definition.

- Success measurement is more straightforward. Measuring data quality or availability in the context of the business process that consumes the data is a reliable and easy-to-explain benefit of data stewardship.

- Once a company launches data stewardship for business processes, it is easy to justify additional data stewards for other processes. The process-oriented model is a very effective way to entrench data stewardship.

The risks of process-oriented data stewardship include:

- Data ownership is more difficult to assign. Because multiple processes use common data (or should), multiple process owners may have different definitions or rules for the same data. A broader data governance program is critical for managing such situations.

- Business constituents can get confused. Just as several business processes can use a single data element, multiple business processes can involve the same business community. Depending on the size of the organization and the complexity of its data, several different data stewards could solicit input from a single end user, causing confusion and sparking political problems.

- In this model, data stewardship is only as effective as the company is clear about its processes. For cultures where processes are nonexistent or immature, process-based data stewardship may not be the best choice.
The system-oriented model is often an effective way for IT to introduce the concept of data stewardship.

Model 4: Data Steward by Systems

Model 4 assigns data stewards to systems that generate the data they manage. Admittedly this is a very IT-centric view of data stewardship. But in most companies, it’s the systems of origin that are the culprits behind poorly defined data, inaccurate values or records that don’t match.

In the dark of night, most companies will admit that the owners of their operational systems are not accountable for – indeed, many are simply unaware of – the data they generate. By addressing data issues at the level of the “upstream” systems that create the data in the first place, a company can propagate more accurate data to other systems and users in a sustainable way. This, in turn, saves work and time as downstream systems acquire robust and accurate operational data.

The system-oriented model is often an effective way for IT to introduce the concept of data stewardship and to proselytize its business benefits. Data stewards can communicate ongoing progress and show how data cannot only improve over time, but how it can affect business outcomes.
The benefits of system-oriented data stewardship include:

- IT is able to take a leadership role in data improvements in cases where the business is unfamiliar with data governance and stewardship.

- System-driven data stewardship can also drive data governance from the bottom up, allowing IT to educate the business about the rules and policies it needs to make the data more useful to the business.

- Assigning multiple data stewards at once is more realistic. The IT edict that “each core system will have a data steward” becomes an established practice, demonstrating a focus on quality that can, in turn, invite closer IT-business alignment.

The risks of system-oriented data stewardship include:

- Business people may equate data ownership with data stewardship, thus assuming stewardship to be “an IT issue” and demurring from conversations about policies and usage.

- Data stewards can become myopic as they maintain the integrity of the data on their systems according to specific processing needs and rules. A business-driven data governance framework is vital.

- A systems orientation doesn’t ensure data sharing or reconciliation. Data stewardship at the system level doesn’t mitigate the need for data quality, master data management or data integration solutions.
A project-oriented approach may be a practical and fast way to introduce data stewardship. Many of our clients embarking on high-profile strategic initiatives understand that data plays a role in the success of these efforts and seek to assign data quality and provisioning responsibility to a team member. Absent a formal data stewardship role, they often turn to available team members with time on their hands – data-savvy or not. This approach can get data stewardship off the ground by using the project as a pretext for cultivating data skill sets.

Unlike with the other four models, project-based stewardship is often a temporary measure. Some corporate cultures need to be opportunistic when introducing new roles and titles. A new project can prove to be a valuable platform for formalizing data management practices and introducing the data steward role. We have seen this work within the context of a project management office (PMO) which assigns and manages data stewards to projects, ensuring that work processes are documented for use by subsequent projects. But, in general, the goal of a project-oriented approach is to prove the value of data stewardship and provide an on-ramp to a more formal approach using one of the other primary models long-term.
The benefits of project-oriented data stewardship include:

- Speed. In cultures that take months to justify head count, the role of a project data steward can be introduced quickly without fanfare and job requisitions.

- Initial data stewardship processes can be tailored to the project's desired outcome, then subsequently refined for broader deployment.

- Success of data stewardship can be tied to the success of the project. While this could be seen as both a benefit and a risk, the ability to tell a story about the project’s information delivery can be immensely helpful in communicating the value of data stewardship to a broader audience.

The risks of project-oriented stewardship include:

- A “project” implies a finite effort, implying that data stewardship is finished when the project is complete.

- Finding incumbent skills can be challenging. Ironically, it is the companies that use project-oriented data stewardship that lack people who are proficient in solid data management, data correction, data administration or enhancement tasks. So-called “warm body syndrome” is a big risk here.

- Any data stewardship processes or technologies adopted within the context of project data stewardship may not be valuable to more enterprise-class data stewardship efforts. Positioning project data stewardship as a data stewardship “pilot” can help manage expectations.

Note that over time, as adoption increases and companies embrace the idea of data stewardship, the data steward role will evolve. The point of the models described above isn’t to cement a permanent structure so much as it is to introduce an initial framework for data stewardship that minimizes disruption while at the same time proving its own value and enriching information in the process.
Many stewardship initiatives fail to gain the momentum they need because they do not have executive sponsorship or support.

DATA STEWARDSHIP

on the ground

The five models provide an important framework for structuring and enacting data stewardship. They establish how data stewards integrate with existing processes and operational activities. To make stewardship last, you need to anticipate and respond to potential challenges and barriers.

Challenges in Deployment

In our work with companies committed to formalizing the data steward’s role, we find some typical barriers to success. Understanding these may help you overcome them.

Corporate Culture

Executives recognize that data ownership falls under the purview of the business; the lack of data ownership arises because few people have any direct responsibility for defining, managing, tracking or improving the data they use. Not only can this reduce the quality of the data – over time it leads to entrenched silos. This causes problems with data reuse and sharing, and has the potential to dilute the value of the data.

A siloed culture can stall stewardship before it starts. Many stewardship initiatives fail to gain the momentum they need because they do not have executive sponsorship or support. Tightening purse strings, concern over staffing and delivery turnaround, and a lack of connection to the overall business vision are some of the reasons there may be resistance to sponsorship. In siloed cultures having an advocate – preferably an executive with both vision and organizational authority – is the best way to ensure that data stewardship has staying power.

Muddled Measures and Responsibilities

Measurement is the most straightforward way to ensure the success of data stewardship. Data stewards should align their work with clear success metrics.

For instance, it is not enough to say:

“Our steward is responsible for overseeing marketing data.”

A better description would be:

“Our business data steward is accountable for customer data in the marketing department. She will reduce the data defects over the course of the year by 5 percent. In year two, the data defects will decrease by 20 percent, and campaign receipt rates will increase by at least 30 percent.”
Notice how these measurements reflect larger departmental objectives, namely improving targeted marketing efforts. If the data steward is credited, at least in part, with such improvements company leaders will not only support but promote the role.

Data Management (or Lack Thereof)

Most companies still don’t spend the necessary analysis and development time understanding where the data is generated, its architecture and how it is administered, as well its security and access rights. Consider the following questions:

- What are the systems of record for key data?
- Who tracks this data as it moves across platforms, applications and business users?
- Who will continue to oversee it as projects expand and grow?

You may also want to consider how leadership views data management:

- Is there a broader recognition of the need for executable processes that will support business initiatives?
- Do you know which sources of data are problematic?
- What kind of requirements exist for the data presently?
- Do you know what levels of data quality are acceptable based on the needs of your business?

Data stewards can’t fix everything, and you will have to undergo a basic assessment of your existing structure and problems to determine where stewards fit and how they can best help you. One thing is certain, you’ll need individuals with data-centric skills. The good news is that you may have existing skills and analysts you can tap for stewardship. Individuals working closely with the source systems could eventually become data stewards. A great way to identify individuals with data-centric skills is by identifying current, unofficial, go-to experts for data-related problems.

Before You Begin

You can improve the likelihood of stewardship succeeding by allocating time for planning. This ensures you are not just “throwing bodies” at a problem but instead promoting lasting changes that will improve your data over time. The following considerations will help you set up a stewardship shop and make it last.
When a company draws discernible boundaries around how data will improve the likelihood of data stewardship success increases.

Small Controlled Projects

Regardless of your chosen model – or hybrid of the models – you’ll need to pick a starting point for data stewardship. If you don’t manage the scope of the initial activities, you may be setting yourself up for premature failure.

One mistake many companies make is earmarking a new data steward’s first project as “inventorying the data.” This establishes neither the business value nor the desired outcome. Simply understanding “where our data lives,” as one client told us, won’t take the company any further toward understanding how to treat, integrate or manage its data for the long term. All too often inventorying data is an academic exercise that takes a long time and concludes without driving any new understanding or follow-up tasks. Conducting a data inventory should serve as the first step to using the data in a meaningful way – to solve a business problem, understand a behavior or unify data for continuity across analytics processes.

When a company draws discernible boundaries around how data will improve in the context of a business effort the likelihood of data stewardship success increases. You open the door for future data-driven projects by demonstrating small successes with clear deliverables. Likewise, small projects can be tweaked, modified and amended more easily.

Formalize the Role

Often companies will simply designate a data steward who already has a “day job.” This infers that data stewardship is part-time or should only happen on an as-needed basis. The ersatz data stewards tries squeezing in data correction activities where he can, but he’s busy. Since he’s not really measured on anything concrete, data management gets second billing and data stewardship gets a bad rap.

Companies truly committed to their data need to formalize the role of data stewardship, crafting a specific job description around the role and, ideally, providing bonuses for business improvements resulting from improved data oversight. This means that managers and Human Resources departments should collaborate in order to determine and document a data steward job description, salary and bonus structures, and hiring guidelines. This prevents data stewardship from becoming an afterthought and makes sure that data stewards have a seat at the table for data-enabled business projects.
We’ve worked with a variety of companies that have not only formalized data stewardship but have seen the resulting business benefits. Not only has stewardship improved the quality of their data, it has also helped foster increased awareness of the strategic role data plays in their companies.

iJET is one such company. The firm, an operational risk management company which monitors and analyzes global events – including civil or political unrest or natural disasters – supports customers by providing insights on potential threats that could affect the safety of traveling employees or expatriates, as well as the operations of their facilities and supply chains.

For example, iJET helped track the volcanic eruption in Iceland a few years ago. iJET’s knowledge and ability to assess the situation prevented clients from being stranded and helped clients in the region mitigate their risks. iJET knows data. Each year iJET processes large amounts of data, monitoring more than 19,000 sources of information in more than 25 languages and tracking more than 110 million travel transactions. With so much data tied to client safety, iJET makes it a top priority to educate internal audiences on the impact of their data. Executives at iJET encourage each employee to take responsibility for corporate data. Charlie Terry, Senior Vice President of Product Management and Product Marketing points out, “At the end of the day, data helps iJET and its customers save lives.” That’s quite an endorsement.

Falguni Sanghani is a data analyst, super data steward, and part of iJET’s Enterprise Data Operations team. She came to iJET with a natural curiosity and desire to work with data. When she was hired in 2005, a large portion of her time was spent cleansing the data. Her role has expanded since then, combining continued data correction responsibilities with increased time defining and documenting data standards, business rules and data guidelines. Her responsibilities now include data profiling, monitoring, cleansing, creating custom reports, and building and designing a customer-reporting portal.

What has made data stewardship – and, by extension, Falguni – successful at iJET is not just her ability to work with the data. It is part of her job to communicate and educate iJET employees and leaders about data-related issues. This means taking time to meet with different business units, explaining how she monitors and manages iJET data and encouraging a dialog with her colleagues. In the process, she learns more about the business needs and uncovers how the same data may be used across various departments. The resulting feedback allows her to go back and analyze the data and ascertain potential new improvement opportunities.

Stewards like Falguni formally:
Collaborating with peers increases over time as business people realize the data is getting better and has greater value.

- Act as the point of contact for data-related issues.
- Help define data procedures, standards and guidelines.
- Arbitrate and mediate conversations between business and IT.
- Work across enterprise departments and domains to promote data integration.

iJET also uses social collaboration tools such as an instant messaging service to connect and encourage employee communication with data stewards. Collaborating with peers and responding to requests for information and assistance increases over time as business people realize the data is getting better and has greater value. Thus, collaboration around data gains momentum.

iJET evolved initial data stewardship activities into a more formal program of data governance. Security and privacy policies are a major part of the company’s data governance program. A data governance council oversees access and privacy policies, while stewards collaborate with the council to enforce the policies and communicate their importance. This has driven additional flexibility around skills and utilization: formal governance processes allow data stewards to pinch-hit for one another when needed. Likewise, iJET established key data quality metrics they wanted to track. These metrics and a number of key reports are then made available to clients and employees. The transparency efforts help iJET demonstrate the value of stewardship to both internal and external audiences. The governance and management of the data has proven to be a credibility-builder with its customers.

Although best practices and common models for data stewardship exist, there are rarely hard and fast rules. Data stewardship is the glue that binds a mature data governance program together. The best data stewards are like Falguni: they have a natural interest in data and zest for analysis that expand data management to become a part of the organization’s culture.
CONCLUSION

In their 2013 research study, *Big Data in Big Companies*, authors Tom Davenport and Jill Dyché cite the increasing importance of data specialization in the new age of big data. Of the more than 20 companies they interviewed in their research, they write:

“Several companies mentioned the need for combining data scientist skills with traditional data management virtues. Solid knowledge of data architectures, metadata, data quality and correction processes, data stewardship and administration, master data management hubs, matching algorithms, and a host of other data-specific topics are important for firms pursuing big data as a long-term strategic differentiator.”

These days, as the phrase “managing data as a corporate asset” is increasingly repeated in executive board rooms, data stewardship is more important than ever. With companies now redoubling their efforts to manage and maintain their corporate information, decisions about data quality tools, integration architectures and data standards must be deliberate. Executives must be willing to enforce rigor and invest in data skills independent of the systems and business initiatives they support. And, most importantly, they need to adapt the resulting tactics to their companies’ own readiness. In so doing, they endorse a data-driven culture and ensure that data stewardship sticks.
about the authors

**JILL DYCHÉ** is Vice President of Best Practices at SAS, and a noted speaker and author. She has counseled executive teams and boards of directors on the strategic importance of their information investments. Executives from companies including Charles Schwab, Verizon, Microsoft, the French National Railroad and Disney have relied on Jill's counsel for aligning business and IT. Jill is a featured speaker at industry conferences, university programs and vendor events. Her first book, *e-Data*, has been published in eight languages, and she is the author of *The CRM Handbook*, a best-seller. Her work has been featured in major publications such as Computerworld, the Wall Street Journal, Newsweek.com, and Forbes.com. She regularly blogs for Harvard Business Review (hbr.org) and Information Week (informationweek.com) and writes the popular In the Biz blog at jildyche.com. Her last book, *Customer Data Integration: Reaching a Single Version of the Truth*, was the first book on the topic of Master Data Management. Jill was the co-founder of Baseline Consulting, a management consulting firm that was acquired by SAS in 2011.

**ANALISE POLSKY**'s keen understanding of people in diverse cultures gives her a depth of insight into working with international companies of all sizes. She has developed and delivered workshops designed to help organizations assess their strengths and incumbent skills, driving strategic shifts in culture, policy and governance. Analise has contributed to several academic journals, including Research in Economic Anthropology and the American Journal of Human Biology. She has developed “how to” workshops in the areas of data quality and data stewardship. She also teaches a popular workshop, “Data Stewardship in Action: Notes from the Field,” which she has delivered in six different countries.