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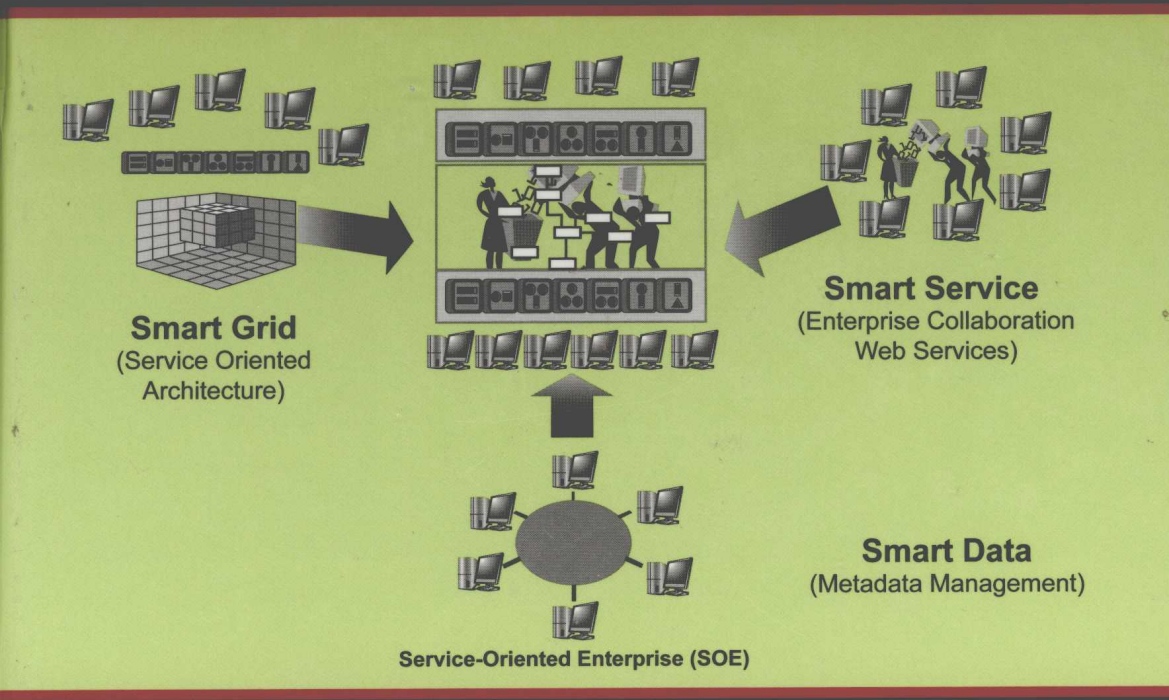

SMART DATA

Enterprise Performance Optimization Strategy

JAMES A. GEORGE

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To my wife, Maureen, for her lifelong inspiration and support for all my endeavors, as well as for preparing the graphics for this book

James A. George

To Mom, Dad and Keiko-san: Domo Arigato Gozaimasta

James A. Rodger

Foreword

Information is the lifeblood of civilization. It has always been so. Many thousands of years ago information was transmitted primarily as the spoken word. Inevitably, ways of recording information were created so that it could be retained and passed on. Thus humans evolved their ability to convey not just data but their thoughts and meanings, their knowledge, through recorded information. The desire to unlock knowledge and put it to use is a compelling impetus for human advancement, and while development of alphabets and writing forms moved on, the literacy of the common person surely lagged behind. Ancient recorded information was likely barely accessible only to a very few in the upper classes. Enter the first wave of mass production of information. The advent of printing made information widely available and, by the end of the 15th century, an estimated 15 million books had been printed on presses. But information still spread slowly down through the strata of society. Even in America during the mid-19th century, books were difficult to access in the rural parts of our young and expanding country. During his youth, Abraham Lincoln sometimes walked miles just to find a book. Fast forward just one century and libraries dot the landscape from shore to shore. In the mid-20th century books were widely available, and most people could read them. Information was available to everyone. But the country was poised to enter an era that would produce a literal explosion of information, unlike anything ever witnessed by humankind. Advancing technology spawned radio, movies, television, computers, the Internet, and the World Wide Web. With technology, everyone could not only get information but could also publish.

Information is ubiquitous. Its ever-increasing volume overwhelms our enterprises and our lives. The question today is not "*Can I get the data?*" The real question is "*What is the correct data?*" In this book its authors, James A. George and James A. Rodger, have taken on a topic imperative for our time. We are awash in data. It comes

at use from every conceivable direction. We cannot absorb it or even grasp the extent of it. Government and business struggle to deal with burgeoning volumes of data.

George and Rodger, in creating this book, have placed themselves in the company of Frederic Taylor, W. Edwards Deming, and Peter Drucker. Making business organizations more effective and efficient has always been a fundamental goal of management science. The authors, in defining smart data concepts and strategy, have put us on the road to making information technology matter again. They persuasively address the problem of "data whose life cycle often outlasts the information technology (IT) paradigm under which it was created." Their work sets a pattern that helps us see how to survive the immutable effects of Moore's Law and paves the way for optimizing enterprise performance in the digital age. Its effect will be to usher in a new age of agility and resilience. Instead of choking the arties of our enterprises, information will once again propel our advancement.

DAVID E. CHESEBROUGH
President, Association for Enterprise Information

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Preface

This book is written for enterprise executives and addresses the single most important activity for which they are ultimately responsible—optimization of performance. Whether you are an executive of government or commercial enterprise, or any other organization, your primary aim is to maximize return from limited resources to accomplish the unique mission and goals of your enterprise. Optimizing performance means applying scarce resources to business processes under constraint and transforming them into highest yield and best use outcomes by managing people and enabling technology.

Our aim in writing *Smart Data* is to contribute to the optimization of enterprise performance with a strategy that will vastly improve enterprise data resource management reflected in more efficient and cost effective information technology (IT) support that produces high impact results for executive and operations management users. "Smart data" describes data that have been engineered to have certain superior characteristics and that is a product of state-of-the-art data engineering discipline such that it is interoperable and readily exchangeable among qualified members of an enterprise user community. Smart data is an executive strategy and tool for exacting higher performance across the enterprise. It operates by leveraging state-of-the-art infrastructure and enterprise services.

Smart Data covers the following points:

1. The context is optimizing enterprise performance, whereby enterprise data resource management is owned by executives and operations management users and not relegated to enabling technologists and information systems specialists.

2. More efficient and cost effective IT support performance is managed and evaluated by executives and users and directly correlated with results.
3. High impact results are engineered from the beginning through collaboration between executives, operations management, and enabling technologists.
4. Measurements are meaningful and expressed in ways that tie directly to optimizing enterprise performance.
5. A strategy and detailed plan is needed that includes roles, responsibilities, and accountability—in the case of government that is understandable by ultimate citizen consumers; in the case of commerce that is understandable by employees, stakeholders, partners, investors, and, ultimately customers.

Included in the target audience are other executive specialists upon whom the CEO depends, such as Chief Information Officer, Chief Technology Officer, and Chief Performance Officer, among all other executives who are unique to your organization type.

There are six elements to this book: Introduction and Chapters 1–4 are the foundation for content presented to the CEO or Department Secretary as the CEO's Smart Data Handbook (Chapter 5). Each chapter element is approximately equal in length. An executive may read and reference Chapter 5 without reading the balance of the book as it is a standalone product. However, a performance advantage will be developed through the reader's complete grasp of topics presented in the entire text.

Introduction presents a *Comprehensive Overview* of smart data and smart data strategy.

- Chapter 1—Context: The case and place for smart data strategy—presents the big picture including critical terms.
- Chapter 2—Elements—presents the essentials for optimizing performance in the enterprise.
- Chapter 3—Barriers—discusses how to optimize performance and how to overcome barriers to optimum performance.
- Chapter 4—Visionary Ideas: Technical enablement—presents enabling technologies to help implement recommendations.
- Chapter 5—CEO's Smart Data Handbook—sums up the book into actionable form for the executive audience.

All enterprises exist for a purpose that is expressed in mission and value statements, goals and objectives, otherwise summarized into business plans. Once desired outcomes are identified, leaders can organize resources into functions. Functions identify the work that needs to be done to produce outcomes. How the work is accomplished is defined as processes where process activities constitute proprietary differentiation.

Proprietary differentiation or unique ways of accomplishing things is achieved through a variety of means that begins with creative leadership:

- Selecting the right customers to service
- Attending to all constituents and specific needs (government)
- Selecting the right things to do
- Organizing activities and designing work
- Attributing activities with application of a superior mix of people and technology
- Applying scarce resources in an optimal manner
- Structuring the balance of consequences such that doing the right things the right way is rewarded and deviations are dissuaded
- Ensuring that customers receive valuable results
- Assuring stakeholders that the enterprise is performing optimally

Data is at the heart of each of these management activities and that is why we focus on data as a principal contributor to optimizing performance.

In today's global performance environment, we are cognizant of economic and political factors that affect the creation and flow of capital and materials moving commercial and government enterprise. We address these issues to the extent that our focus and subject relates, as they do indeed, though we resist the temptation to deviate from our immediate focus that is bounded by the terms enterprise performance optimization and smart data.

We employ two types of case studies to support and illustrate our ideas: (1) scientific/academic and (2) anecdotal/programs. The scientific/academic examples tend to support the technical aspects of smart data whereas the anecdotal/programs are more philosophical and qualitative. All examples are intended to give real world life to our ideas.

We ask our readers to work with us to discover the transferability of our examples horizontally, across different types of enterprises, functions, and structures as they truly apply broadly. We ask you to understand that our efforts to develop, innovate, and apply our ideas are constrained by the opportunities that we have to work with client organizations. Therefore they may not be perfect examples, though they are surely honest ones.

DIFFERENT VIEWPOINTS: EXECUTIVE AND INFORMATION TECHNOLOGIST

This text is written from different viewpoints:

1. Government: James George is a government consultant who also has extensive commercial enterprise management experience and is also a business process improvement consultant.
2. Academia: Dr. James Rodger is a college professor and government and commercial consultant who worked with George on the *Battlefield Backorder Initiative (B3I)* and *Supplier Response Improvement Program (SRI)*

for the U.S. Department of Defense. Dr. Rodger is an expert in the subject of decision support and management information systems.

The B3I/SRI project involved analyzing millions of backorder military parts records to determine attributes that could be used to predict, prevent, and mitigate perpetual shortages plaguing actual war combatants. The effort produced predictive methodology and algorithms that illustrate the applications of a part of our vision for smart data and smart data strategy. Former DOD client (retired), Donald Hall, collaborated with George in creating the *Service-Oriented Enterprise (SOE)* paradigm and notion of "smart data."

RECENT EXPERIENCES AND USING THIS BOOK

Some contributions to the effort are from recent experiences that have produced pioneering achievements in enterprise integration included:

- Creating the SOE paradigm for the U.S. Department of Defense
- Developing data exchange capability leveraging international standards for neutral translation
- Developing the Integrated Data Strategy (IDS) for DOD with roots in ideas developed by aerospace contractors
- Harmonizing electronic business standards and practices in the aerospace and defense industry
- Pioneering uses of metadata
- Applying artificial intelligence methods to decision making
- Publishing case studies on business process redesign
- Creating algorithms to solve complex business problems
- Generating program coding to enable problem solving

This text employs comparisons and contrasts to differentiate the unique characteristics and value from the smart data paradigm and is written with the following ideas in mind:

- Directly addresses the responsibilities of Mr./Ms. Secretary and CEO
- Compares/contrasts *enterprise performance optimization* versus *enterprise integration*
- Makes data strategy an explicit element of enterprise performance optimization versus subordinating to infrastructure elements
- Compares/contrasts *government enterprise* versus *private enterprise, and collaboration*
- Compares *smart data exchange* versus *standardization*

This text makes smart data strategy explicit, understandable, and actionable to those entities capable of leading their unique contribution to enterprise performance. Proven examples are provided of how government and business enterprises can achieve their missions and goals more effectively so:

- Leaders discover unique performance improvement advantages from adopting smart data strategy
- Government enterprise executives improve ability to achieve results more quickly
- Commercial enterprise participants discover how to maximize demonstrated value to government enterprise participants and discover how to maximize demonstrated value to government enterprise as members of the supply chain as prime contractors, subcontractors, and suppliers
- All benefit from more cost-effective strategy that changes information management economics.

By surveying government and commercial enterprise customers for a number of years, and from having been directly engaged in related topics for more than 15 years, we observed the following:

- Deficiencies and omissions from government and commercial data strategy
- Advances in commercial enabling technology with gaps in application and implementation
- Continuous investment in information technology on a large scale
- Increasing pressure on government and private enterprise for better use of scarce resources as invested in information technology
- Improved commercial-off-the-shelf technologies that can accelerate adoption of smart data strategy
- Requirements for management and technical training

A survey of Amazon.com and other publication sources show the same publication titles appear when searching "data strategy" and "enterprise integration" with some notable attention to the subject as envisioned in *Adaptive Information* by Jeffrey T. Pollock and Ralph Hodgson. Pollock also worked on a government program where his concepts were applied to enterprise services and security architecture development for a major weapon systems program. This landmark publication is a technical foundation on which the complementary smart data strategy presented here is advanced.

Current publications are leveraged here by positioning and differentiating beyond the current literature so

- Commercial vendors champion our message.
- Enterprise leadership adopts our ideas as they become collaborative partners in future development.
- The book becomes a catalyst for change and improvement by providing *uniquely actionable* methods.

What makes the book "*uniquely actionable*?" Messages are organized by processes and targeted to specific audience segments in a collaborative context. Practical examples are designed to appeal strongly to executive interests and priorities in a strained and recovering economic environment.

WHO NEEDS THIS BOOK?

The audiences for this book are:

- Government management and technical enterprise executives
- Commercial enterprise participants in government enterprise: systems integrators and prime and subcontractors
- Technology providers
- Academics: graduate students in private institutions as well as the Defense Management University and others
- Members of professional associations and international standards organizations
- Congressional staff and governance organization, such as Office of Management & Budget and General Accounting Office
- Governance boards

At the core is the desire to make a difference in government and commercial enterprise performance. By advancing this smart data strategy that was developed as a product of discussions during development, we show it has worked effectively in the past. One of our first products on this journey is to produce a powerful strategy for power-filled enterprise leadership.

As a consultant in the early 1990s, George used the phrase "catalysts for change and improvement" in an article for *Business Engineering Newsletter* to characterize various initiatives embraced by management for a period of time, however fleeting, for the purpose of motivating organizations to change their behavior. Such catalysts have life cycles. Recollection about the Western Electric Hawthorne studies prompted this observation. George thought it humorous that the act of studying workers' environment, changing lighting conditions, adding and removing light bulbs and such, could positively affect human performance. It was the act of attention to workers that mattered most as concluded by landmark research.

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Deliberate though unscientific observations reveals that management often grows tired of catalysts that manifest in programs, initiatives, projects, and slogans before they actually catch on. It takes time for people and organizations to grasp their intent, and by the time they do, management has moved on. They either move on physically to another station, or they simply change their minds.

The hazard from changing in midstream was revealed in studies performed by a former colleague, Michael Reiman Ph.D., who determined that attempts at implementing concurrent engineering strategy without following through to completion produced worse results than if the organization had not embarked upon change at all.

Often, to realize the benefit, organizations must confirm that they have the capacity for change and improvement that is a combination of capital, material, and intellectual resources, including management and technical. What capacity will it take to change from their present intent to actually adopting a smart data strategy? This book provides a construct for answering this question.

Of course, there are numerous examples in management science history about CEOs who lead with initiatives aimed at improving quality and service, and reducing costs. Often, CEOs are engineers who introduce a degree of science and math to their initiatives, principally aimed at desired metrics and outcomes. Today, the more popular catalysts do this such as "Six Sigma" and "Lean." Efforts such as "CMMI" aim at improvement from processes and continuous process improvement. "Balanced Score Card" addresses a mix of dynamics with corresponding elements in organization strategy.

The more complicated catalysts are, the least likely they are to become sustainable. They burn out too soon. One reason for this is organizations have limited capacity for change and improvement. Leaders must select strategies that can be accomplished by organizations within the bounds of certain resource constraints.

Our natural inclination is to change the subject every so often because we get bored. We sometimes confuse overcoming boredom with a quest for continuous improvement. A better way to regulate our inclination to move forward is to insist on accountability for milestone achievements as a prerequisite.

Commercial enterprise must pursue becoming best at what's new. Government enterprise must optimize enterprise performance and leverage the most from commercial trading partners. That is why we devote considerable attention to the sources of best technologies to determine what they offer to implementing smart data.

In government, it is interesting because leaders are encouraged to embrace best commercial practices and commercial-off-the-shelf technologies for which the metrics aim at maximizing profits for shareholders, which is quite different from government's desire to maximize service utility for citizens. Government leaders have predictably short tenures that accompany planning and budget cycles that exacerbate the short time in which they have to apply their talent.

The magnitude of problems and needs, and their associated life cycles are large and long respectively. Do the catalysts used by government executives possess characteristics best suited for their tentative tenure? We don't have all the answers to this question, although by being aware, we can factor this into our recommendations about strategy to improve performance.

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Arlington, Virgina
Hooversville, Pennsylvania
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J. A. G.
J. A. R.

Contents

Foreword xi
Preface xiii
Acknowledgments xxi

Introduction: A Comprehensive Overview 1
Predictive Management 8
IDEF Lexicon for Executives 10
Organization of This Book 12
Smart Data in Three Dimensions 14
Business Rule 16
Case Study: IT Capital Budgeting Using a Knapsack Problem 17
Case Study: Better Decision Making: Field Testing, Evaluation and Validation of a Web-Based MedWatch Decision Support System (MWDSS) 19
Engineering an Ubiquitous Strategy for Catalyzing Enterprise Performance Optimization 21
What *Smart Data* Provides 24
References 24

1 Context: The Case and Place for Smart Data Strategy 27

1.1 Value of Data to the Enterprise 27
1.2 Enterprise Performance Versus Enterprise Integration 46
1.3 Current Problems and Deficiencies from Poor Data Strategy 54
1.4 New Technologies 62
1.5 Breaking from Tradition with Improved Results 78
References 83

2 Elements: Smart Data and Smart Data Strategy 85

2.1 Performance Outcomes and Attributes 85
2.2 Policy and Business Rules 90
2.3 Expectations: Managerial and Technical 92
2.4 Capacity for Change and Improvement 93
2.5 Iteration Versus Big Bang 94
References 128

3 Barriers: Overcoming Hurdles and Reaching a New Performance Trajectory 129

3.1 Barriers 129
3.2 Overcoming Barriers 130
3.3 Top–Down Strategy 151
3.4 Balance of Consequences and Reinforcement 173
3.5 Collaboration 173
3.6 Enterprise Performance Optimization Process 174
3.7 Enterprise Performance Optimization Architecture 175
3.8 Scoping, Scheduling, Budgeting, and Project and Program Management 187
References 189

4 Visionary Ideas: Technical Enablement 191

4.1 Today's Possibilities 191
4.2 Calibrating Executive Expectations 236
4.3 Five Years from Now 242
4.4 Ten Years From Now 277
References 277

5. CEO's Smart Data Handbook **279**

5.1 Strategy 279
5.2 Policy 314
5.3 Organization 316
5.4 Actions 316
5.5 Timing 320
5.6 Funding and Costing Variables 320
5.7 Outcomes and Measurements 320
References 320

Index **323**

Wiley Series in Systems Engineering and Management **329**

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