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Strategic Management of Business-Critical Information Assets

Denise A.D. Bedford

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Denise A.D. Bedford
Georgetown University, USA

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Preface

OVERVIEW OF THE SUBJECT MATTER

Information management is the practice of managing information assets to ensure organizations realize their value and minimize their liabilities. Over the past seventy years the business value of information is increased. Today, information is a critical and competitive business asset. Today information is increasingly acknowledged as a capital asset comparable to financial and physical capital assets. This increased value and recognition is fueled by the transformation from an industrial to a high technology to information and finally a knowledge economy. Managing information as a capital asset means a radical shift in how both the business and the information professionals manage information. It means managing information like a strategic capital asset. It means putting information assets front and center as a core business function rather than a back-room or support operation. It means shifting the business role in information management from a custodial role to a lead ownership role. It also means managing information according to the stages of its life cycle – capital assets have long lives. Financial and physical capital assets are managed according to their life cycles – this shift is fundamental to the transformation to a knowledge economy.

This shift in perspective and action is not trivial. A few organizations have made this shift and they are notable for their pre-eminence in their sectors of knowledge economy. The reality is that most organizations are still managing information as a by-product of business. The goal of this book is to help organizations understand the changing landscape, to understand what it means to manage information strategically, for the business to take a lead and for information professionals to adapt their practices to meet the challenge. Achieving this goal is also not trivial. Methods for auditing information as a capital asset – including assigning value and calculating liabilities – are emerging but not yet stable. Information management remains a fragmented

profession with nine distinct areas of practice – no single holistic definition of the field exists. Each area of practice has its own training guidelines and its own professional societies. Information is generally managed indirectly through information management salaries and information technology investments. There are no accredited education programs or professional associations that focus on the full information life cycle.

No single book, no single education program or professional society can tell an organization how to manage their information assets strategically. Information capital assets are context-sensitive. Context includes the external business environment, the internal business environment and an organization's business goals and capabilities. Strategies must also be reasonable, suitable, aligned with the organization's culture, and livable – they must be relevant to the organization's day to day decisions.

Defining a business-driven strategy means translating and adapting theory and practice. In a complex profession like information management there are many and varied theories, reference models, standards and peer-reviewed literature. The purpose of this book is not to evaluate and assess those contributions but to synthesize and interpret them in a way that promotes awareness but does not select and promote one theory over others. It attempts to sketch the landscape so the reader can better navigate the issues. For this reason, there are two types of sources listed in each chapter. Sources that are cited throughout the chapter are clearly listed as References at the end of the chapter. And, there are sources the reader may wish to consider for further reading, including references to theories, reference models, standards and other peer-reviewed literature. These sources are listed as Additional Reading. Neither set of sources is comprehensive or exhaustive – historically or going forward. Much more needs to be considered and written on this topic.

This book is intended to guide an organization through the transformation process. The book highlights key issues, explains concepts and consequences, and shares common experiences and examples. The book will not tell you what to do, but it will tell you what you need to think about and how to think about it.

There are several good books available on many facets of information management. There are good texts on the management of different types of information - digital assets management, data management, records management, web content management, publications management. There are several good texts on selective stages of the information life cycle – information design and formatting, information description and organization, metadata management, information search and discovery, information use,

and information preservation. And, there are a few good texts on the business value of information. The gap in the literature – which this book attempts to fill – is a holistic view of information management.

The holistic view presented in this text is a reflection of the author's professional career. The author's experience over the past four decades has included all types of libraries (public, corporate, federal, and academic), all functional areas of libraries, book and journal publishing, information and business architecture roles, lead and support roles in systems development, systems configuration and systems migration, academic teaching and academic research in all stages of the information life cycle. In every project and in every context the author looked for but failed to find a book like this one – a book that would have helped to make the case, understand the consequences, and avoid the "groundhog day" syndrome. In every experience the author saw successes and failures – successes that went unrewarded and failures that went unacknowledged. Throughout the book the reader will find Business Stories. These stories are neither real nor fictional – they are combinations and versions of the author's experience and knowledge of real world business challenges, responses and results. None of the business environments described is truly a real story. The purpose of a business story is to provide the reader with an opportunity to interpret the ideas covered in the chapter.

If the book meets its intended goal, every copy will be heavily marked up and commented. Each copy will bring the reader into a larger conversation about information management. If the book achieves its goal, there will be a renewed call for an information management education and training foundation. If the book achieves its goal, there will be more voices from the business in the conversation. And, ideally there will be fewer liabilities and risks resulting from poor information management decisions.

WHERE THE TOPIC FITS IN THE WORLD TODAY

This topic fits squarely in the field of information management. This topic pertains to information management, to business strategy development, but most importantly to the topic of economic transformation. In order to understand the need to shift our thinking and our practices, we need to have a good understanding of how the economy is changing and how these changes affect business. Businesses – all kinds of organizations characterized as "b"usinesses – need to understand how information is changing the external business environment, the internal working models, and how it is affecting

their own bottom lines. Some of the obvious signals are increasing pressures to use the existing information to generate intelligence and insights for decisions, or the increasing pressure to automated business rules engines and to create business rules repositories. The move towards a knowledge economy means organizations need to have a good handle on the stock of business information. What guidance exists today is written for information professionals and written in the language of information professionals. This book attempts to present a business perspective in jargon-free language with concise explanations of information concepts and issues.

WHERE THE BOOK FITS IN THE LITERATURE TODAY

This book acknowledges, builds upon and expands the existing literature on the topic. Specifically, it aims to update the treatment of information first introduced by Davenport, Prusak and McGee in their excellent early texts. It also leverages concepts from and highlights the important of business and competitive intelligence textbooks. It draws upon the good texts on records management, digital asset management, web content management, document management and data management – without duplicating the depth of coverage of those texts. This text highlights and references the in depth literature on information security, metadata, information organization, search and discovery and preservation and disposition.

This text introduces the concept of information culture, references and extends the work of key researchers in that topic. The treatment of information culture is novel in that it considers the impact of information culture on strategy. It also offers suggestions for how to enhance and nurture information culture to support information management strategies.

This book takes as a core assumption that information is a capital asset in its own right. As an asset it is equivalent to other assets including technology, physical assets and financial assets. This text considers technology as an enabler and a consideration – but not a key focus point – in the strategic management of information. Information technology concepts are highlighted in every stage of the information life cycle. The potential costs of, value and liabilities generated by technologies are also discussed. Information technology does not play a prominent role in this text, though, because technology must be managed as a separate and distinct capital asset. As should be evident

throughout the text, focusing on information technology tends to mask the information life cycle, to hide the important decision points, and to downplay the risks and liabilities of poor information management.

Description of Target Audience

The target audience for this book includes business managers, information management professionals and practitioners. The audience also includes deans and directors of education programs in all of the nine areas of practice. Because information management is local, national, regional and global - the intended audience is global.

STRUCTURE OF THE BOOK

The book is organized into four sections and 15 chapters. Section 1 aims to explain the challenges and opportunities of managing information as a capital asset. This section is comprised of three chapters including Chapter 1, "Information: Challenges and Opportunities"; Chapter 2, "The Business Perspective"; and Chapter 3 "The Information Management Perspective." Section 2 explains how to develop an effective information asset management strategy and how to operationalize that strategy through governance. This section includes four chapters including Chapter 4, "Developing Your Strategy"; Chapter 5, "Strategies for the Long Term"; Chapter 6, "Strategies for the Near Term"; and Chapter 7, "Governance Models and Methods."

Section 3 is a roadmap for operationalizing your strategy. This section mirrors and focuses on the six stages of the information lifecycle. It includes six chapters including Chapter 8, "Creating and Capturing Information"; Chapter 9, "Classifying and Securing Information"; Chapter 10, "Organizing and Describing Information Assets"; Chapter 11, "Finding and Discovering Information"; Chapter 12, "Accessing and Using Information"; and Chapter 13, "Preserving and Disposing of Information."

Finally, Section 4 focuses on sustaining your strategy by highlighting the two things that are likely to undermine it. In this section, the two chapters include Chapter 14, "Information Cultures, Roles, and Responsibilities"; and Chapter 15, "The Cost of Managing Information." A detailed list of sections and their chapters is presented below.

Section 1: Understanding the Challenge and the Opportunity

- Chapter 1. Information: Challenges and Opportunities
- Chapter 2. The Business Perspective
- Chapter 3. The Information Management Perspective

Section 2: Designing a Strategy

- Chapter 4. Developing Your Strategy
- Chapter 5. Strategies for the Longer Term
- Chapter 6. Strategies for the Near Term
- Chapter 7. Governance Models and Methods

Section 3: Operationalizing the Strategy: Tactical Issues

- Chapter 8. Creating and Capturing Information
- Chapter 9. Classifying and Securing Information
- Chapter 10. Organizing and Describing Information
- Chapter 11. Finding and Discovering Information
- Chapter 12. Accessing and Using Information
- Chapter 13. Preserving and Disclosing Information

Section 4: Staying the Course

- Chapter 14. Information Cultures, Roles, and Responsibilities
- Chapter 15. The Cost of Managing Information

CHAPTER SUMMARIES

Chapter 1 presents a working definition of information and makes the case that information is a capital asset. Examples of value and liabilities of information assets are offered. This chapter exposes common myths surrounding information management. A framework for managing information strategically is also presented.

Chapter 2 presents the business perspective on information management and makes the case for a business-owned and business-driven information management strategy. This is a new argument. A business-driven strategy

is defined as one that aligns with the future external and internal business environments, supports near and long-term business goals and capabilities, and is reasonably aligned with the organization's resources and expectations.

Chapter 3 describes the information management perspective. This chapter explains the history and evolution of information management. The nine general areas of practice are described against the backdrop of the information life cycle.

Chapter 4 focuses on the basics of strategy including definitions and structures. This chapter argues for developing a long-term strategy first, assessing the current strategy and finally bridging the gaps. This chapter stresses the importance of business ownership and focus.

Chapter 5 explains why it is important to begin with a long-term vision of the future. Strategies should support visions of the future but how does one develop a reasonably reliable vision of the future? A range of futuring methods are described.

Chapter 6 focuses on the development of near-term strategies and assessing the current situation. This chapter argues for a realistic and critical assessment of your current information management strategies. It also argues for and explains how to conduct an internal audit of your critical information assets. This chapter is important to achieving some level of parity with the management of an organization's other capital assets.

Chapter 7 considers how to design and leverage governance methods to support your information management strategies. This chapter makes the case for a critical review of current governance processes and for assessing how governance is aligned with day to day decision making. This chapter also presents a framework for assessing current governance practices.

Chapters 8 through 13 focus on the key business questions and decision points across the information life cycle. Key concepts are called out and explained to form a high-level glossary and introduction for business managers. These chapters also highlight some of the key considerations and consequences of different choices. The key questions are further discussed in different internal business working environments and in future external business environments. Chapter 8 focuses on the information creation and capture stage. Chapter 9 addresses information security and classification issues. Chapter 10 addresses key questions to ask about organizing and describing information assets. Chapter 11 presents concepts and consequences of different choices for discovering and finding information assets, including the design and development of search systems. Chapter 12 considers key questions and choices pertaining to accessing and using information assets.

Finally, Chapter 13 focuses on the end of life cycle stage. This chapter explains the basic elements of information asset disposition and preservation.

Chapters 14 defines culture and describes information culture as a subset. This chapter interprets the three elements of culture in the context of information management. Examples of information assumptions and beliefs, values, norms and behaviors, and information artifacts are presented. This chapter argues for taking stock of your information culture. This chapter describes how roles and responsibilities may be leveraged to shape a culture that will support your strategy.

Chapter 15 looks at how an organization thinks of information related costs. This chapter argues for a shift away from seeing cost decisions as salaries and technologies to actual investments and liabilities. This shift is important to achieving parity of information as a capital asset. This chapter presents a formal definition of cost from the cost accounting perspective. Four categories of factors related to investments and liabilities are presented. Costs and liabilities are discussed within and across stages of the information life cycle.

Finally, the appendix presents a checklist an organization might use as a foundation for beginning to formulate and implement an business-driven information management strategy, or to assess the business-focus and the sufficiency of a current strategy.

HOW THE BOOK IMPACTS THE FIELD

This book is a first step towards pulling together all of the diverse practices called information management. Rather than highlight the differences across those practices the book aims to find common ground and to harmonize around the information life cycle. Rather than looking to the past or at current practices, the book encourages both the business and the information agents in an organization to focus on the future. The book makes the case that information is a capital asset and will be a critical production factor in the knowledge economy. This book aspires to bridge diverse perspectives – to create a dialog around the need for a holistic view of information management. This book aspires to fill a gap in business's understanding of information management practices. If it encourages a dialog about these issues, it will have served its purpose.

Section 1

Understanding the Challenges and the Opportunities

Chapter 1
Information Challenges and Opportunities

ABSTRACT

Drawing from the discipline of information science, this chapter presents a working definition of information. This chapter explains how information is a capital asset and how those assets can generate positive value or negative liabilities. The challenges of managing information assets are also considered. This chapter begins to lay out the argument for thinking strategically about information assets.

WORKING DEFINITION OF INFORMATION

Information is both a simple and a complex concept. It is a concept familiar to and used by everyone. This would suggest that everyone has a common understanding of information. In fact, information means different things to different people in different contexts and at different types.

A working definition of information is a prerequisite for managing information strategically. A working definition is a foundation for how you and your organization will think about and treat information. A working definition is the starting point for developing a common language about and culture of information. The language and culture of information provides a vocabulary to use in communicating about and managing assets and liabilities. Language represents how people think and what they understand about something. And strategies are grounded in language.

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Dictionary definitions of information offer two perspectives (Oxford, 1989). The first focus is the act of communicating knowledge or ideas among two or more people. Information professionals expand the communication focus into *information-as-a-process* and *information-as-knowledge*. The information-as-a-process suggests that when someone is informed, what they know is changed (Pratt, 1977). Information-as-knowledge focuses on the process of leveraging information to build a person's knowledge and intellectual capital (McElroy, 2010). This definition will not serve us well as a working definition for understanding how to manage information strategically it focuses on managing communication. Dictionaries also define information as the message content itself. Information professionals define this as *information-as-thing* (Buckland, 1991). *Information-as-thing* focuses on traditional text and narrative content, as well as data, documents, and other physical objects that may be informative in a broad sense. This second definition will suit our purposes well.

Having a working definition is a good starting point for integrating the many perspectives around your organization. The business managers in your organization will focus on data and intelligence – scientific, technical, operational and medical data and intelligence in particular. The economists in your organization will tend to see information as an input to economic decisions and a commodity. Technologists understand information as an object that is manipulated and managed by systems and technologies – the message as a package rather than the content in the message. As you move forward to develop a common language about and culture of information, it is important to speak to and integrate these important perspectives.

INFORMATION AS CAPITAL

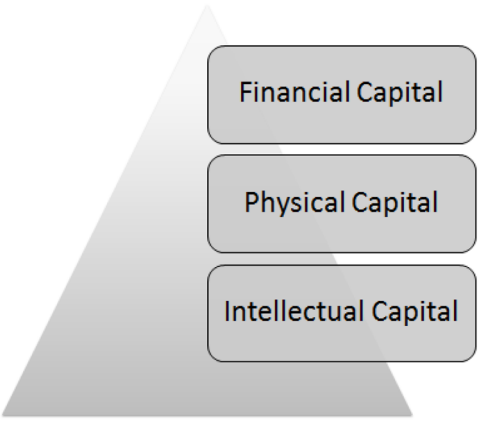
The term capital has several meanings and is used in many business contexts. In general, capital is accumulated assets or ownership. Accountants define capital as the amount of cash and other assets owned by a business. Capital can also represent the accumulated wealth of a business, represented by its assets less its liabilities. From an economic perspective, capital assets are produced goods that are used in the production of goods and services. In an economic system, capital is the primary means of generating wealth. Control and proper management is tied directly to wealth creation. Capital assets are different from other kinds of assets because they generally constitute a

durable source or stock which is not significantly used or consumed – rather we invest in these assets to create other things. Capital is an input to the production process – whatever it is that an organization does to create value for its stakeholders. Capital is something that is produced. It is an input to the production process – it contributes directly to the production of any products and services an organization may generate. Capital assets are inputs to the production process which we tend to "wear down" and use up over time. We depreciate capital assets to account for this gradual devaluation.

Capital falls into three categories including physical capital, financial capital and intellectual capital (Figure 1). Physical capital was a major factor of production in the agricultural and industrial economies. Physical capital includes land, factory equipment, all of the computer infrastructure of a company, the buildings, office furniture, or anything that has a life expectancy of several years. Financial capital includes an organization's financial stock – not its receivables and payables for example, but its financial reserves, and any financial resources that are invested in initiatives, experimental products and services. We know what physical and financial capital we have because we account for them on balance sheets.

The third category of capital is intellectual capital. Intellectual capital is the stock of human knowledge, its structural knowledge, and its relational knowledge (Figure 2). Andreissen defines human knowledge to include an all of the tacit knowledge, skills, competencies, attitudes and behaviors of the people who work for an organization. Andriessen defines structural

Figure 1. Types of capital

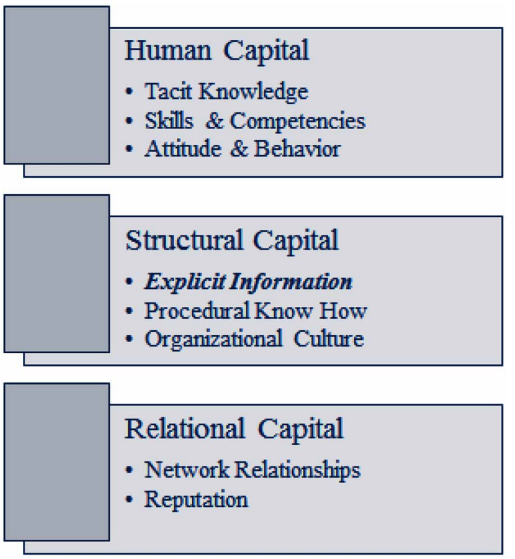


knowledge as all of an organization's explicit information, its procedural knowledge and know-how, and its culture. Relational capital includes all of an organizations relationships and its reputation. In order to succeed in the 21st century knowledge economy, organizations must invest in, manage and grow their intellectual capital. In the 21st century knowledge and intellectual capital will be the most important of all capital assets an organization can possess. Information falls into the intellectual capital asset category – specifically as explicit information assets.

There are three forms of intellectual capital, including human capital, structural capital and relational capital. This book focuses on the management of explicit information which falls under structural capital. Of all of the types of intellectual capital, this is the one that has a tangible form and can be explicitly seen and touched. The other seven types that are called out in the model are what are referred to as intangible capital assets. Explicit information is used to produce other goods and services, and it is also produced by the organization. It has a long life span – which is determined by its business value to the organization.

Information capital is managed with a business strategy just like physical and financial capital. The strategy is all about maximizing the effectiveness of using it. In this regard, your information management strategy is no different

Figure 2. Types of intellectual capital



than your strategy for managing financial and physical capital. An information management strategy should be approached like any business strategy – it should involve senior leadership, it requires some kind of analysis of how well those things are being invested.

INFORMATION CAPITAL ASSETS AND LIABILITIES

Like other forms of capital, information is a thing that can be either a valuable asset or a costly liability to an organization. Managing information strategically means understanding your information assets as capital assets and leveraging those assets to increase the capital value of your organization. Every organization has a strategy for managing capital, including accounting, auditing, inventory, balance sheets and investment methods. Information that is not managed will not have capital value to the organization. Information is a capital asset that requires a strategy just like other capital assets. What kind of a strategy is suitable to information capital? What challenges do you need to be aware of?

In today's open information environment, information that is not managed carries tremendous potential for business risk and liability. Information assets and liability are specific to a context - every organization needs its own information management strategy. Thinking strategically about information management means understanding information first as a kind of capital, and then as valued business assets and liabilities. What are some examples of information capital assets? What are some examples of information capital liabilities?

Information as a Capital Asset

A capital asset is both something that has been produced and one that will be used to produce resources and services in the future – a resource from which future economic benefits are expected to flow. An asset is a resource that is available for use or which represents what the organization owns or has access to for use in business processes and production. Assets have tangible form, have an extended life span and enduring value – they are not consumed in a single production run.

How do we find and characterize information assets throughout the business? Like other capital information assets are inputs to business processes and

outputs from those business processes. Here are a few examples of information assets and their general value to an organization.

- **Internal Documents as Information Assets:** Internal documents as inputs to any process, decision or business action because they represent the organizational memory of what has worked, what has not worked, the conditions present at any time, the process followed, and who was involved, and as the products of all of those business actions and decisions.
- **Project Documents as Information Assets:** Project documents as inputs to a new projects because they describe in detail the historical approach to building, configuring and operationalizing an enterprise search or a personal records application. Project documents that represent the results of a project shared with stakeholders and investors.
- **Financial Documents as Information Assets:** Financial documents and reports that represent critical business intelligence about the organization's investment decisions, business successes and failures which provide valuable insight for future strategic planning and investment decisions. These also represent the inputs to the visualizations created by data scientists, the products of financial analysts and strategic planners and investors, and key information for stakeholders and shareholders.
- **Email Communications as Information Assets:** Email messages and exchanges as explanations of conditions or answers to questions which may impact how a decision is reached. Email messages as the products of discussions and the representation of decisions reached and documented as the organizations business actions.
- **Web Content as Information Assets:** Web content, communications and social media containing official business statements, information for customers, feedback on the organization's performance and products, networks are inputs to product design, performance improvement, customer concerns and extending the organization's network. They all directly represent and effect the organization's reputation and presence in the business environment.
- **Publications as Information Assets:** Publications including books and articles are formal representations of what the organization does – in many cases they are the organization's products. They describe what an organization does, how it does it, and how it presents those results

to external stakeholders. These products become important inputs for external stakeholders and researchers.

- **Data as Information Assets:** Data and data products that contain operational and transactional data are increasingly valued for data analytics and business intelligence value – as inputs to business decisions and to performance improvement and engineering. In many cases, data are critical inputs to new product development – consider real time traffic and weather, retail inventories and deliveries, energy usage, fuel supplies.
- **Product and Service Descriptions as Information Assets:** Service descriptions and procedural documentation describe where, when and how the organization delivers products and services to both its internal and external stakeholders. This information is a critical input to the organization's development and offering of products and services, and to the role these play in the organization's reputational capital.

Information as a Capital Liability

A liability is something that an individual is responsible for – a legal debt, a deficit or an obligation. Liabilities are deficits – they draw value from what should otherwise be a positive value. In the context of information capital asset management, a liability is something or some action that diminishes the value of an intellectual capital asset. We tend to think about information liabilities as simple poor performance or decision making. This masks the financial, reputational and intellectual capital impact to an organization. We include ten examples of situation that have produced liabilities to increase our understanding. Each of these speaks to the need for strategic and thoughtful management of information.

- **Opportunity Costs as Liabilities:** Opportunity Costs or the use of assets in a way that adds less value than what might have derived from another investment. An organization purchases an expensive enterprise content management system, configured and installed in a way that doesn't fit into how people work every day. As a result, no one uses the system and the organization has to hire additional staff to find and file documents. The purchase price was so high that other options are now not feasible, and the sunk costs are too great for the organization to walk away from.

- **Lost Investments as Liabilities:** Lost investments or the wastage and misuse of assets. An organization purchases a large enterprise financial management system but due to information politics configures it in a way that allows individual units to continue their historical financial management practices. As a result, the system's standard reporting capabilities cannot be used. New custom code must be developed to produce results. The internal financial and audit controls built into the software are now turned off. There is a loss of trust in any financial reports generated.
- **Missing Information Assets as Liabilities:** This situation arises when an organization fails to manage information in a way that allows others to easily find them. For example, an organization has produced multiple research products on the same topic each contradicting the other in some small way. Clients have copies of the products but internal staffs are unaware of them and the organization's reputation suffers when clients offer them to staff.
- **Unauthorized Access or Presence as Liabilities:** This situation may arise from the unintended exposure or disclosure of information. Information that is either improperly classified or does not have embedded security properties may be available and accessible to others outside the organization. Organizations have had secret or confidential documents exposed to the press. This situation can damage the organization's reputation, result in a loss of competition or increased risk exposures.
- **Misappropriation or Forged Information:** An Individual takes the ideas of another colleague, inside or outside the organization, and presents it as their own work. As a result, the person is put in charge of directing a project. Ultimately, the project fails because the project leader had only a superficial understanding of the topic. In this case, the organization has both real sunk costs associated with the project, opportunities costs, and a loss of trust and credibility – all resulting from the misappropriation of information. Information forgery can be more serious where an external report contains forged or misleading information which is used to make business decisions.
- **Unvalidated or Untrusted information as Liabilities:** This is a common business intelligence use case. The organization has an opportunity to purchase good quality customer financial data or to obtain "good enough" data at a lower price. The lower quality data is chosen and as a result, poor management decisions are made in

offering products and services to customers. The poor quality products and services results in law suits to the company. In the end, the small amount saved is dwarfed in comparison to the long term costs to the organization.

- **Loss of Information as a Liability:** This situation may result from the organizations failure to protect, preserve or maintain assets properly to ensure their full life span and business utility. An organization puts individuals without rigorous data management experience in charge of migrating 40 years of project information in a system upgrade. They fail to ensure there are proper backup and roll back procedures in place. When the migration fails, there is a loss of 20 years of information about the individuals associated with projects. This results in an internal loss of trust with the technology teams. Additionally, it is a significant loss of relational capital – the networks of project related individuals have been lost.
- **Low Quality or Junk Information as a Liability:** In this example we define low quality or junk assets to be those which include untested or invalidated information. These assets present a risk if they are used to generate products or if they are offered as a product themselves. For example, an organization hires a consultant in a field office. The consultant conducts research and prepares a report which is promoted to the central office. The central office is not aware that the work has not been vetted and offers it as corporate advice to others. When used by another field office based on corporate recommendations, the advice fails and results in both a reputation risk to the company, and a loss of trust in corporate decision making.
- **Duplicative or Redundant Information as a Liability:** An organization has no strategy for managing information or for identifying record copies of important business information. They are called into court and must support information discovery of key assets to settle a case. Because there is no strategy to identify record and convenience copies, they are unable to provide the final versions of documents. Instead they must provide all versions of documents – record and convenience- and this exposes the internal conversations and thinking that helps the plaintiff prove their case. In addition to the legal costs, the organization realizes how much of its financial resources are now going to support multiple and duplicative storage solutions around the organization.

- **Information Politics as a Liability:** The organization fails to establish a business-oriented information culture at the leadership, business unit and individual levels. As a result, individuals compete with one another to the detriment of the organization, business units withhold information from other units that would benefit from it, and the leadership team uses information to diminish the reputations of colleagues rather than to build business partnerships and cooperation. The loss of productivity at all levels is significant when the time devoted to competition is analyzed. In some cases, organizations may be losing millions of dollars in lost productivity and opportunities.

There is no organization today that has not experienced one or more of these situations. How has each situation been handled? Typically these situations are handled not as liabilities but as technology failures, personnel failures or management failures. They are treated as a lesson learned rather than taken seriously as a costly liability. Each of these liabilities could have been avoided – to the benefit of the organization – if information assets had been managed strategically.

INFORMATION MANAGEMENT CHALLENGES

We have a working definition of information, and we understand how information can be a capital asset. We need to treat information like other capital assets. We have well established management and accounting methods for treating physical and financial capital. Information falls into the category of intellectual capital assets. We invest in physical capital by purchasing and caring for machinery, land and other tangible resources that are primary factors of production. With financial capital, you invest by conserving that capital and then investing it in processes and products. We recognize the need to manage our information assets, but we also acknowledge some simple challenges. Some challenges pertain to the physical and economic properties of information, and others pertain to common myths and misperceptions. Let's review some of these challenges to better understand how to meet and counter them.

Information Is an Experience Good

A product or service where features or characteristics such as quality or price are difficult to observe in advance of a purchase. You may not be able to judge its value in advance of a purchase, but once you've read it, watched it or used it, you no longer have a need to purchase it. This presents challenges for defining a market value. We meet this challenge by understanding the consumption and valuation patterns of information assets.

Information Is a Public Good

A public good is one that is non-rivalrous and non-excludable. Non-rivalrous means it can be consumed by a collective of consumers (radio broadcasting, national defense, air, etc.). Non-excludable means if one individual consumes the good, the amount of the good is not reduced -- the good is still available for consumption by others (creative works, information, patents, etc.). Exclusionary goods are goods that individuals cannot use unless they pay for their use. Exclusionary goods reflect clearly defined property rights. Non-exclusionary goods are goods that some people can use without paying for them. Those who consume information without paying for them are called free riders. Public goods require special market mechanisms to ensure that an efficient solution is achieved for both the producer and the consumer. This makes it challenging to asset a market-based business value. We meet this challenge by considering alternative valuation strategies such as costs incurred or replacement costs.

Information Has Opportunity Costs

An opportunity cost is the cost of making a decision or consumption choice over an alternative one. Opportunity costs go beyond simple financial costs – in the case of information, it includes any other investment that might have been made instead of managing information capital. We meet this challenge by ensuring that liabilities and potential failures are clearly identified prior to making any investment decisions.

Time Is an Indirect Cost of Information

One of the most significant opportunity costs associated with information consumption is time. In order for information to have any utility to a consumer, it must be used. Information can only be used by being read, watched, listened to -- the key element here is time. If consumers perceive the utility of information to be less than the value of their time, they will not consume it. Unused or non-consumed information capital is a significant liability. We meet this challenge by considering the value of unused assets and their costs, including sunk costs and recurring cost of maintenance and storage.

Information Is a Non-Depleting Resource

Information itself doesn't go away when it is used or consumed in a production process. This is one reason we characterize it as a capital asset. Rather than diminishing through use and expenditure, though, information generally increases in value and rather than diminishing through use, information increases in value. We meet this challenge by ……

Information Is Tangible and Manageable

Information is often confused with knowledge and the other seven types of intellectual capital which are intangible. Our working definition of information-as-thing definition implies that information is a tangible object. This is important because it allows us to define its economic properties. This is the case when we're talking about "information as a process" or "information-as-knowledge" which is clearly intangible. The properties and nature of intangible and tangible objects are different. We can see and monitor tangible objects as they move through their life cycle. We can manage them as we manage other physical assets. We meet this challenge by defining focusing on Information-as-a-thing which has a long term life span and business value based on the organizations information records series and its retention policies.

Information Is a Stable Asset

This challenge pertains to the information-as-process characterization. Two great thinkers have clearly distinguished information and knowledge. Albert Einstein famously said that the knowledge recorded in books is dead knowledge

because it is no longer alive, learning and changing. Peter Senge, author of Fifth Discipline and other knowledge management texts, has famously said that there is no knowledge in books, suggesting that knowledge is dynamic changing and perishable and encoded and physically represented knowledge of books is unchanging. These distinctions are important because they highlight the properties of two different kinds of assets and the importance of having different strategies to manage them. We meet this challenge by focusing on tangible and stable information assets and developing a knowledge management strategy to support dynamic assets.

Information Management Is a Conscious Responsibility

Because information is so pervasive, it is important to ensure the whole organization is aware of its value. Though challenging, some attempt should be made to assign value to information assets to ensure that they are being managed. We meet this challenge by focusing on business critical information assets and defining their business value. This means we will need more than one method to assign value to our assets.

Information Management Is Deliberate and Proactive

Ease of creation and access leads us to believe that information should be self-managing, is persistent and easy to access. Information assets can be found in many different places throughout the organization. Wherever information lives, it should be managed strategically. We meet this challenge by designing a strategy that fits into the way people work, does not require additional work or work arounds, or extra thinking.

Information Is Not Just a By-Product

There is a widespread perception that information is a byproduct of what we do and as such needs less attention that the processes and tasks we perform to support our business. Information cultures that view information as a by-product result in information management that is postponed or neglected. Information is a critical business asset. It is an essential input and output of every business process but taking time to manage it depletes the resources required for those processes. We meet this challenge by defining a vision for information and making it an integral part of how and what you manage for business purposes.

Information Has Positive and Negative Values

There is a common misconception that information is benign – it either has value or it does not have value. It doesn't cause a business any harm so we don't need to worry about how we handle it. In fact, recent events in unintended disclosure and misappropriation remind us of the liabilities associated with information and the need to manage them. Information assets that are unmanaged or poorly managed may cause liabilities. Liabilities may carry a low risk and cost, or they may be catastrophic for an organization. The risk of harm of any information asset should be considered and assessed. We meet this challenge by treating information as a capital asset. Your strategy should describe how value is assigned to information assets, and how you manage this kind of capital.

The Costs of Information Liabilities Are Significant

Liabilities should be seen for what they are – direct, indirect and opportunity costs to the organization. Information carries a cost if it is not managed statistically. We can't afford the costs of an enterprise-level training program and we don't need a team of information managers. Information can quickly turn into a liability if it is not managed strategically. The proliferation of practices, technologies and approaches can lead to fragmented choices and implementations. We meet this challenge by ensuring that any information management practices are clearly tied to the value and liabilities of assets.

Information Management Is a Core Business Process

Information management is understood to be an enabling business capability. Information management is not positioned in an organization a core business function. Information is a critical resource for every business capability, and information management is a responsibility of every business unit. We meet this challenge by acknowledging the role information plays in enabling your business, but should also consider the broader role that information plays in positioning your organization in the information, the networked and the knowledge economies.

Information Is the Everyone's Responsibility

Administrators often assume that information professionals will manage information across the organization and from the sidelines. When the business does not take ownership, the information management strategy will always be a source of tension and a competition for resources. We meet this challenge by developing a strategy that is driven by business needs and owned and lived by business managers. Business must take responsibility for information as a capital asset. Information management should be led by individual(s) who have a broad perspective and understanding of the information life cycle and information management practices.

Information Management Is a Complex Profession

There is no single information management practice or a single information management education foundation. Rather, information management practice is fragmented across several professional specializations. Each specialization has its own principles, standards and working culture. Specializations may present conflicting priorities and perspectives, which introduce a degree of confusion for organizations. When seen from an information perspective, it may appear to be a complex, cumbersome and sometimes contradictory set of guidelines and processes. There is no one view that supports all information management processes. Rather, there are nine areas of practice that focus on different types of information or address different stages of the information life cycle. We meet this challenge by ensuring that the information asset management strategy reflects and integrates all perspectives and encourages an organization-wide information culture. The information culture must be business focused and information management enabled.

How can you meet and overcome these challenges? By developing a strategy that is grounded on strategic thinking and the business value of your information capital assets. More particularly, your strategy should:

- Rely on a suitable valuation strategy for information assets
- Focus on the tangible characteristics of information assets
- Focus on managing static information assets and use a different strategy for managing dynamic intellectual capital assets
- Recognize the unique economic properties and behaviors of information assets in its treatment of capital accounts, audits and balance sheets

- Identify and assign value based on one or more acceptable valuation methods
- Recognize that information needs to be managed comparable to other capital assets
- Recognize that information is capital and a product of the organization's business
- Recognize the potential liabilities that may result from business practices and cultures and highlight tactics that reduce their risk
- Manage the direct, indirect and opportunity costs associated with information capital
- Treat information management as a core business process rather than a secondary or enabling process
- Recognize that information management is a business role and responsibilities that is shared by all staff throughout the organization
- Harmonize and synthesize the variant areas of information practice into one that suits the business needs of the organization

THINKING STRATEGICALLY ABOUT INFORMATION MANAGEMENT

Thinking strategically means defining a strategy that is *reasonable* and is *suitable* to the organization's needs. Dictionaries tell us that something is *reasonable* when it is fair, sensible, moderate, appropriate, and reflects sound judgment. Your information management strategy is *reasonable* when it is balanced in terms of investments and risks, makes good business sense and judgment, is moderate in its expectations, and is appropriate for the context and time for which it is developed. Designing an information management strategy that is *reasonable* requires a deep understanding of the business and of information management theory and practice.

Your information management strategy is *suitable* when it (1) enables the organization to meet the challenges of the changing economic environment; (2) supports the way your organization works internally – at an operating level; and (3) supports your core business capabilities and operations. How does your strategy align with the changing economy? The economy has been shifting from an industrial to a technology to information and a knowledge economy for the past sixty years. Knowledge economy will reward those organizations who go beyond the basic financial and legal requirements

to leverage their informational capital assets in a proactive, innovative and creative way. To survive in these new economies, organizations need a strategy that will allow them to keep pace with the evolving role of information will play. You need to understand the nature of these evolving economies. Every strategy should include a future vision as well as a near-term strategy. It is important that your strategy addresses future possibilities even if you don't have the resources to achieve any of them today. If you have a vision for the future, and you've raised awareness across your organization, creative and innovative ideas will come forward. Achieving a future vision is easier and more effective if it comes from the ground up and middle out than if it comes from top down

How does your strategy align with the way the organization works? A generic strategy might look good on paper but if it does not fit the organization's operating model – how it is structured, how information is produced, where and who designs information products and services, whether there are organization wide standards or policies or whether local units maintain control – it is likely to be ignored. In that case, local strategies and tactics will take the place of an organizational strategy.

How does your strategy align with and support your business goals and capabilities? The strategy addresses information management as an integral part of how the organization works, particularly its core operational capabilities. This alignment is based on a deep understanding of the organization's core and operational business capabilities.

Defining a strategy that is *reasonable* and *suitable* not a trivial task. Chapter 2 provides further guidance on how to determine what is reasonable and suitable. This book is designed to guide you through the process of identifying your information assets and liabilities, determining how and where they support your business, and the key information management issues and decisions you'll need to make.

A BUSINESS STORY: TALKING TO MANAGEMENT

The Business Environment

This story comes to us from a private sector law firm. The internal business environment is one of tight financial coordination but of autonomy within areas of legal expertise and practice. Each practice has its own clients, but

billing is handled centrally. While there are centralized time and financial management systems, information, communications, documentation and decision records are managed differently and consistent with the practice lead's preferences. While this approach is effective for meeting a client's needs, it presents a challenge for sharing or accessing information across the practice.

The Business Critical Challenge

A new practice area has emerged externally and the firm realizes that it has the expertise to compete in this new market. However, to compete effectively they will need to leverage the legal expertise of several teams. Existing areas of practice must continue to exist, but there is a need to create a new practice which will draw from historical and current information sources. A legal assistant with knowledge of the practice and information management practices is assigned the role of building a cross-firm information practice. She is tasked with developing a draft strategy for firm-wide information management. The assistant draws from her experience working with legal information sources and legal discovery processes to prepare a strategy she believes will work for the whole firm. Coming from the legal profession the assistant takes the legal culture as a given – her draft strategy presumes she must start with a document which provides extensive explanations, makes references to sources and precedents. She believes this is the way to convince the partners and lawyers that her strategy will succeed. She presents her strategy – which is a 20 page document – to the firm's partners and the partners share the strategy with the lawyers of the leading practice areas.

The Business Response

The extensive strategy document is perceived as another burden which their practice area must support. The strategy is ignored by some and rejected by others. The negative reaction is easily explained - time is money in this business environment and even a 15 minute block of time that cannot be billed to a client is a negative cost. The extensive strategy is clearly going to cost them time and money to implement. Practice leads suggest that sharing information will be more expensive than hiring in new staff and creating new sources to support any new practice.

The Result

The assistant is thanked for developing the strategy but told that the strategy will not meet business needs. In fact, given the response of the firm lawyers, the partners have decided to create and staff up a new practice area. The new team will be given the resources they need to acquire and manage any new legal sources. In the end, this approach puts the firm at risk because there are now overlapping practices and the risk of providing variant legal advice or creating tensions among areas of practice grows.

A Strategic Approach

A better approach might have been to prepare the context for a formal strategy by raising awareness of the value and liabilities of information management. The assistant could have considered how information adds value or creates liabilities for this specific firm. She might have anticipated the common misperceptions and myths surrounding information management – particularly those that might be inherent to the legal business. During the first month after she is tasked to develop the strategy, she finds opportunities to meet with the partners, the key practice lawyers and their staff. During these meetings she listens to their thoughts on information, and gently introduces stories or experiences that might shift their basic assumptions and values. Her stories include both positive and negative responses and results. She also takes opportunities to engage people in casual conversations throughout her travels around the firm. She also realizes the importance of including experiences from other peer firms in her stories. In background, she prepares her strategy. She develops a two-part strategy. The first part is a justification of the strategy designed to build consensus for moving forward. The second part of the strategy lays out high level actions that she knows have support from the key players. In fact, she is able to reference and give credit for ideas that were offered during her meetings. The strategy is accepted and moves forward because it speaks to and draws from the business value of information while also addressing common concerns. She has also created a foundation for her strategy to succeed.

CHAPTER TAKEAWAYS

From this chapter, you should:

- Understand information capital assets are critical business capital
- Understand information as a tangible and manageable capital asset
- Explain why you need a strategy to manage information
- Explain how information is a capital
- Differentiate between information assets and information liabilities
- Understand the key challenges of managing information
- Explain how to think strategically about information management

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Chapter 2
The Business Perspective

ABSTRACT

This chapter explains what it means and why it is important to craft a business-driven information strategy. A business-driven strategy is one that is suited to your internal and external business environments. The chapter references authoritative models for describing your internal working environment to ensure that your strategy is supportive rather than contradictory. The chapter also suggests an approach for modeling business capabilities to better understand what critical business assets and liabilities. Additionally, the chapter provides guidance to assure your information is reasonable from a business perspective. Finally, the chapter considers how to bridge the gap between business and information management practices.

BUSINESS DRIVING THE INFORMATION STRATEGY

An information management strategy is a business strategy and a business responsibility. We need a strategy to ensure that value is realized from assets, and to ensure that liabilities and risks are minimized. Every organization must apply and adapt the definition, language and the culture of information to suit their business needs. This is the essence of managing information – managing your information in a way that suits your business needs. Managing information strategically means managing it as more than a support function – it means managing information as an asset that has value and that carries risks and liabilities. Organizations must develop their own strategy, understand it, believe in it, and live it. This book is designed to help you do that.

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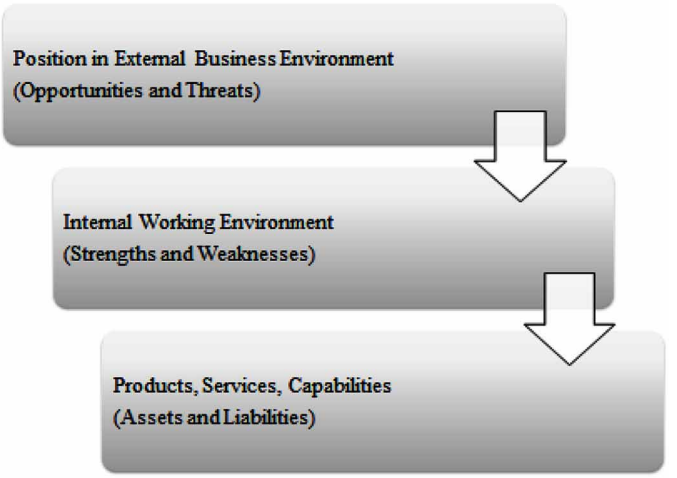
Your strategy should be aligned with and supportive of your key business drivers. An information management strategy is business driven if it supports the way you work – your operating environment, supports your business goals and capabilities, and is responsive to changes in the larger business environment. Using someone else's strategy and changing the names and words, or using a template from consultants does not produce a strategy that is driven by your business. Only your own business administrators and your operational staff can design and implement a business driven strategy. Organizations can engage coaches and mentors, but ultimately this is an internal business process and decision. Business-driven also means aligning your information management practices with your business drivers.

Information management strategies should be both reasonable and suitable to the organization. What do we mean by suitable? What do we mean by reasonable? A strategy that is suitable is adapted to a use or purpose and is well defined to meet a need. First and foremost, information strategies must be suitable to the business needs of the organization. For the purpose of this book, we define suitable as defined to meet the organization's (1) current and future position in the external market and economy; (2) business operating environment and working model; and (3) business goals and capabilities. Suitable strategies thus support the organization's business vision, its operational working models, and its tactics (Figure 1).

Figure 1. Suitable information strategies



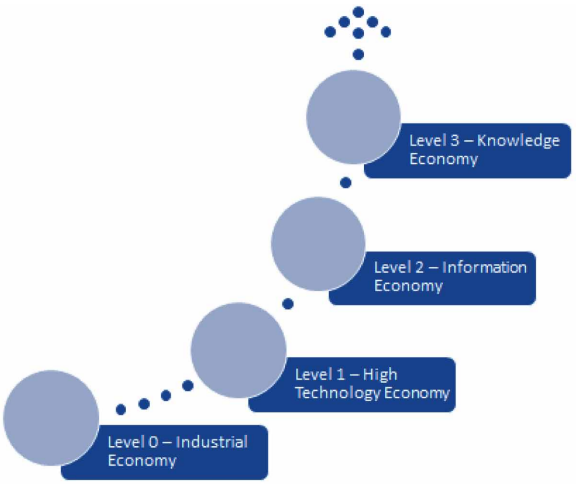
STRATEGIES THAT SUIT YOUR EXTERNAL BUSINESS ENVIRONMENT: OPPORTUNITIES AND THREATS

Today every organization is operating in a rapidly changing and unstable economic environment. The external economic environment tells us something about how other organizations and our competitors will manage their information assets. As the economic environment shifts, the strategic value of information assets increases. The transition from an industrial economy to a knowledge economy has been underway for the past 50 years. The transition is likely to continue over the next 50 years. This is not a temporary situation, but one that will continue for the next fifty years. The instability is due to the existence and evolution of four complementary economics, including the industrial economy, a high technology economy, an information economy, and a knowledge economy. No one of these economies is distinct – rather they each build upon the others. Each economy, though, does represent a transition from an economy that makes minimal use of information to an economy that is grounded in information (Figure 2). We characterize these economies as Levels are defined by the role that information plays in each economy.

Industrial Economy (Level 0)

The industrial economy serves as a baseline. Industrial economies place higher value and have well established strategies for managing physical and financial capital. They view information as a by-product of doing business. Information management is a support function which is defined and developed by information professional without significant input from the business. It is often viewed as a high cost to the organization rather than a function with value. Information management principles and guidelines are driven by legal requirements, financial requirements, and external standards compliance. Information management in an industrial economy typically focuses on capture and storage. It is often the case that information management is fragmented and sporadically implemented across the organization. Some organizations today continue to operate in a traditional industrial economy. A pure industrial economy is rapidly disappearing and few organizations will still find themselves in this situation. Most organizations today find themselves competing in a high technology economy or an information economy.

Figure 2. Evolution of industrial to knowledge based economies



High Technology Economy (Level 1)

A high technology economy is one in which organizations systematically use information in the key business areas. Technology is used to great advantage to move information across technology applications and is packaged in ways that make it consumable across the organization. Information management may be systematic in this economy – technology is leveraged to better support each stage of life of information. Organizations operating in a high technology economy will have developed a business intelligence operation. There will be some systematic approach to identifying and managing business critical types of information.

Information Economy (Level 2)

An information economy is one in which organizations will make systematic use of artificial intelligence in business processes and in the management of information. Organizations successfully operating in an information economy may have developed automated business rules and have constructed business rules engines. The value of information to every business process is understood. Business processes pull data from enterprise repositories, and store and use it without human intervention. Information is designed and packaged for use, rather than just for compliance or routine capture and retention. The redundancy of information is managed. Information governance processes are in place

and quality controls are part of the way the organization works. Information management is the responsibility of every person in the organization, and there is a health information culture. There is a growing awareness of information liabilities, but the management of risks and liabilities may be limited to high cost applications and high value operations.

Knowledge Economy (Level 3)

A knowledge economy is one in which knowledge is both an internal and an external business product. In a knowledge economy, business units take responsibility for their own information needs and understand the value the information they produce has to the organization and the economic sector. Organizations are aware of their internal information markets. In a knowledge economy, organizations maintain balance sheets of their information assets and liabilities. They are part of the organization's capital asset management practices. Information assets and liabilities are defined and monitored by business managers, just as they monitor the health and well-being of their physical and financial resources. In the knowledge economy, the definition of information remains consistent but the scope is broader due to an expanded generation of information. Information liabilities are actively managed and risks/failures are held accountable. This latter characteristic is a clear distinction from all earlier economic contexts.

The key question to ask here is – what is the nature of the economy in which my organization is operating today and how is this economic sector changing? Will is remain largely a high technology sector or is it showing signs that it will transition to a knowledge economy in the next 30 years? Understanding how your economic sector might change will help you to define a strategy for managing information to survive in that future economy.

STRATEGIES THAT SUIT YOUR INTERNAL BUSINESS ENVIRONMENT: STRENGTHS AND WEAKNESSES

It is important for an organization to design an information strategy that suits its operating environment. An operating model descries the way and organization works, how it structures its decision making, how it allocates management responsibilities, how it defines its information products, and how it governs itself. How you deploy your strategy depends on how your organization works

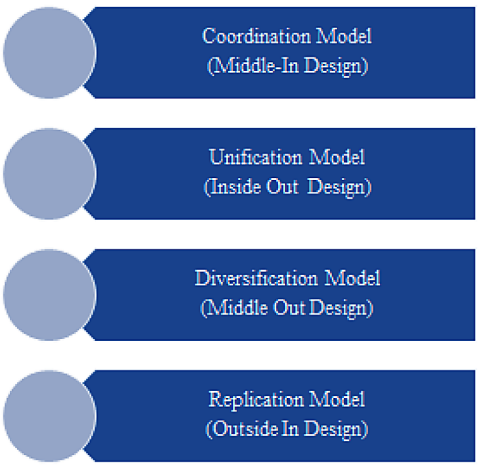
and how it is structured. For your strategy to have business value, it must be implemented. Your strategy will be implemented by decision makers and by units that produce and use information. It is important to understand where these decision makers are, what authority they have to make their own or different decisions, to understand how agreement is achieved, and how the infrastructure that is in place supports these decisions.

An information management strategy that introduces new burdens and requirements to business units without adding value will be ignored. Defining a strategy that does not suit your operating environment will lead to tensions, work arounds, and the strategy not being implemented at any level. To ensure your strategy is suitable to the working environment, you need to understand your working environment. In their book, *Enterprise Architecture as Strategy* Ross Well Robertson (Ross Weill and Robertson, 2006) describe four operating models that have emerged over years of real world practice. These four models - Coordination Models, Unification Models, Diversification Models, and Replication Models (Figure 3) can help you to characterize your own working environment.

Coordination Models

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized

Figure 3. Internal business working environments



by shared clients, products and information. A 'middle in' information management strategy is appropriate because it acknowledges a common set of information assets which may vary at the unit level. Variations may emerge due to local business practices or due to client inputs or product adaptations. The model provides for a common foundation of information assets but there may be variations in value and liabilities depending on the local environment. The information management strategy might take on a federated design in terms of governance and decision making. It will be important to build your strategy around a strong governance model to ensure that different business needs and operations are supported. Integration means continuous involvement of the business if the strategy is to succeed. Your information management strategy should also be translatable to different environments and different economic situations. Your long term strategy should be extensible, to allow for the fact that different business units in different environments might change at different rates.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In this model, a strategy must be grounded on a deep understanding of business processes and the way that processes are designed. This model requires strong engagement of business managers in the formulation and the realization of the strategy. In this environment, broad consultation and involvement is critical to a workable information management strategy. Inclusive governance is critical to sustaining a workable strategy in this environment. There is a very high risk of redundant information assets in this model. Redundancy may be necessary to support the business, but unmanaged redundancy will generate liabilities and lessen value.

Diversification Models

Diversification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed,

and business units maintain control of processes. There are few information standards in place and decisions are made independently. Infrastructure related decisions are also independent and infrastructure design may be unique to a unit or location. In this environment, the driving force must be integration around common assets. Liabilities and risks will vary because of different business processes, different decision making authority, and a diverse client base. This is not an environment where the strategy can be written, posted and left open to interpretation by individual units. In this environment, the strategy must be supported by continuous discussion and conversations about information management practices across all business units. Governance is important to ensure that variant practices are acknowledged and balanced, wherever possible. An information management strategy that is grounded on a federated design is likely to be more effective in this environment. Extensibility of information asset models will also be critical. Invisible common asset models may be necessary to achieving an organization wide information management strategy in this case. The diversity of the client base raises concerns about the diverse language and jargon and the need to map, interpret and translate in background.

Replication Models

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. This environment offers a good foundation for success in its standardization of information products. However, the diversity of clients suggests a need to support different perspectives in looking for, finding information, in assigning security classification, and in supporting enterprise access and availability. Local ownership of products may also introduce risks to the early and final stages of the information life cycle. Governance will be a critical component of your strategy to ensure that local ownership and local decision making are supported by and supportive of the information management strategy.

STRATEGIES THAT SUIT WHAT YOUR BUSINESS GOALS AND CAPABILITIES

Finally, information strategies should align with what it is that the organization does to produce value to its clients and stakeholders. Productizing information assets, assigning value to them, ensuring and managing use, identifying and mitigating risk – all those critical capital asset management tasks are best positioned at what we call a business capability level. A business capability is what the organization does to perform or produce something of value to the organization's stakeholders. A capability is expressed in terms of outcomes and services that provide value to stakeholders. Capabilities describe *what* the organization delivers as opposed to *how* the organization works or *how* (business process) it delivers the *what*.

Business on a Page (BOAP)

An organization's full repertoire of business capabilities takes the form of a Business on a Page (BOAP) (Figure 4). A Business on a Page organizes capabilities into three categories, including (1) strategic capabilities; (2) operational or core capabilities; and (3) enabling capabilities. Different kinds of capabilities have different levels of value to the organization. Strategic capabilities are important because they speak to the future direction of the organization. Operational or core capabilities are those which speak directly to the value for which the business exists – these capabilities are valuable, rare, costly to imitate and non- substitutable. Enabling capabilities are those which support the day to day functioning of the organization – they add value indirectly.

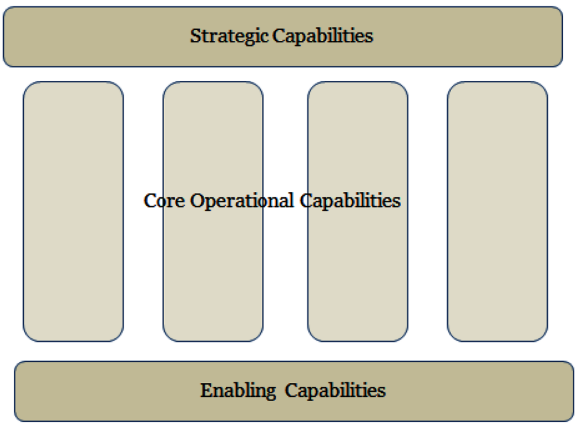
What are some examples of strategic, core operational and enabling capabilities? Let's take a college or university as an example. For a university strategic capabilities might focus on learning, advancing the state or stock of knowledge, and contributing to an educated citizenry. A university's core operational capabilities might include providing a high quality undergraduate education, providing a high quality graduate education, advising groups on subjects, advocating for advancements in science and engineering, and ensuring the financial health of the institution. Enabling capabilities are fairly consistent across organizations – they may include providing a well trained workforce to support the institution, providing a secure work environment, ensuring the health of the organizations physical infrastructure, and so on. It

is the core capabilities that distinguish organizations and describe the reason they exist. Core capabilities and how they leverage or produce information capital assets is our focus. Enabling capabilities may manage information capital assets poorly and so create a liability for the organization. However, such a liability will not likely endanger the business or its future. Where operational capabilities poorly manage information capital assets we might expect such liabilities to present an existential risk to the business.

Core Business Capabilities

It is core or operational capabilities that distinguish one organization from another. Operational or core capabilities are those that define the essential business of the organization. These capabilities must be – valuable, rare, costly to imitate, non-substitutable. Capabilities that help a firm to exploit opportunities to create value for customers or to neutralize threats in the environment are *Valuable*. *Rare* capabilities are those that are possessed by few current or potential competitors, are difficult to imitate, and result from complex relationships that cannot be replicated such as trust, teamwork, informal relationships, and causal ambiguity. Capabilities that other firms cannot develop easily because of unique historical conditions, causal ambiguity or social complexity are Costly *to Imitate*. Capabilities that do not have strategic equivalents, such as firm-specific knowledge or trust-based relationship are *Non-substitutable*. This speaks directly to the use of intellectual capital assets.

Figure 4. Graphical representation of a business on a page



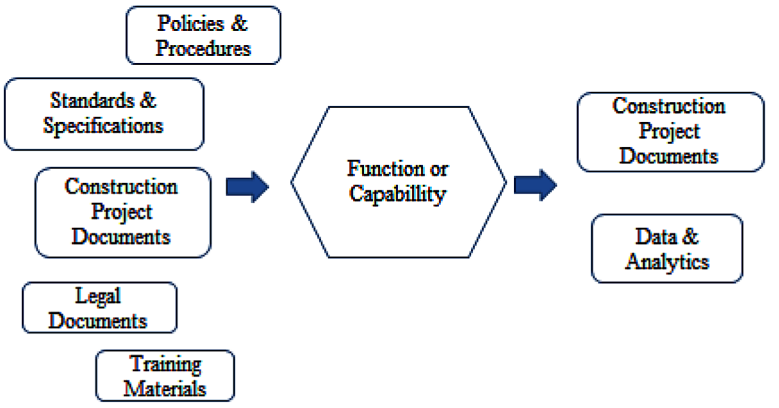
Capability Models and Methods

Organizations focus on managing the physical and financial assets that support core operational capabilities because they represent the lifeblood of the business. Information assets contribute to and are associated with the value of a capability. Anchoring your strategy on core operational capabilities also facilitates defining the value of your information capital assets – we can infer some value based on the value generated by the capability. We can also infer the financial impacts of a liability or a risk associated with the asset – based on the impact the liability has to the economic value of the capability. The capability-focused methodology gives us a strong foundation for discovering assets and liabilities. Evaluating assets in relation to their capabilities allows us to discover impaired assets and write-downs (Saint-Onge, 2003; Bedford, 2018; Harvey & Lusch, 1999), to discover asset gaps or asset management actions that have the potential to put a business at risk, to identify and correct core rigidities – information capital assets that are creating organizational inertia and preventing the business from changing in response to its external environment. A capability model is a mechanism identifying all of the resources – in this case information assets – that are used to fulfil a capability or function (Figure 5). The capability model also defines the assets that are produced. Capability models are good foundations for identifying assets, and for operationalizing, auditing, assessing and reporting on the results of your strategy. It is a simple model which allows any unit engaged in the capability to participate in a planning or strategy session because it is organization - and administrative-agnostic. More information about the capability modelling methodology can be found in the business literature (Teece Pisano & Shuen, 1997).

STRATEGIES THAT ARE REASONABLE

Dictionaries define reasonable as not extreme or excessive, but moderate and fair, and reflecting sound judgment. There are many perspectives from which we can define what is reasonable. First and foremost we define reasonable as to be what works for the business – a strategy that is moderate and reflects sound business judgment. A reasonable information strategy would be one that ensures that the legal, financial and operational needs are being met. A reasonable strategy is one that is applies sound judgment in its investments

Figure 5. Capability model with information assets as inputs and outputs



and risks, that covers all of the valued information capital assets and mitigates information capital risks. We offer ten guidelines to help you develop a reasonable strategy. The first five are drawn from the *Sedona Guidelines for Managing Information & Records in the Electronic Age* (1995).

- **An Organization's Strategy Should be Balance Value and Costs:** What does this mean? It means that it is important to understand the value of your information assets and their risks. It means the level of effort is consistent with the value and liabilities. It means that the information management strategy is grounded on internal and external business needs.
- **An Organization's Information Management Strategy Should be Realistic, Practical and Tailored to the Circumstances of the Organization:** What does this mean? It means that the information management strategy is designed to support the way the organization works, and do not introduce new direct or indirect costs that impact the organization's business. To the extent possible, the information strategy should be seamless and intuitive, and are adapted to the organization's capabilities and processes.
- **An Organization Need Not Retain All Electronic Information Ever Generated or Received:** What does this mean? It means that not all tangible information assets have equal value. A reasonable strategy is grounded on knowledge of the value and liabilities of each information asset.

- **An Organization Should Also Develop Methods and Tactics That Support the Strategy by Addressing the Creation, Identification, Retention, Retrieval and Ultimate Disposition or Destruction of Information and Records:** What does this mean? It means that the information strategy should support the information life cycle, leveraging good information practices at every stage. It means that good practices should be translated and interpreted to support the business context. It means that it is not sufficient to simply have information policies and procedures. The information strategy should focus on key decision points and core business capabilities.
- **An Organization's Information Strategy Should Allow for the Suspension of Ordinary Destruction Practices and Procedures as Necessary to Comply With Preservation Obligations Related to Actual or Reasonably Anticipated Litigation, Government Investigation or Audit:** What does this mean? It means that your information strategy should be flexible and adaptable to meet business demands. The information strategy is first and foremost a business strategy – business demands take precedence over information
- **An Organization's Information Strategy Should Cover Information Assets Which are Both in the Print and the Digital Eras:** While the strategy for managing formats may differ the strategy should be consistent in terms of asset management and liability mitigation tactics. What does this mean? It means that your strategy should be grounded on a clear and obvious understanding of your organization's information assets and liabilities.
- **An Organization's Information Strategy Should be Easily Interpreted and Understood – It Should be Trustworthy, Dependable, and Reliable. It Should be Easily Understood by Any Person in the Organization:** What does this mean? It means that your strategy should be the foundation for and reflect a holistic information culture.
- **An Organization's Information Strategy Should be Affordable. A Strategy Which has Lofty Goals and High Aspirations Cannot be Implemented if it is Neither Cost-Effective Nor Cost-Beneficial:** What does this mean? It means that your strategy is designed to meet your business needs and reflects on a practical level the resources that are available to support those needs.

- **An Organization's Information Strategy Should be Suited to the Organization's Workforce. A Strategy Which is Beyond the Skills and Competencies of the Information's Whole Staff Will Not be Fully Realized**: What does this mean? It means that your strategy is aligned with business roles and that those responsibilities can be reasonably absorbed and carried out by anyone in the organization.
- **An Organization's Information Strategy Should Have a Realistic Life Expectancy. As Business Needs Change, the Information Strategy Should Also Change. The Strategy Should Be Reviewed and Updated With the Business Planning Strategy:** What does this mean? It means that your strategy should be adaptable and adjustable over time, that your strategy continues to support business needs as those needs change.

Bridging the Gap: Business to Information Professionals

The information management strategy must be business-drive and business-owned. The strategy must be visibly owned and lived through actions and decisions every day at the business unit level. Information capital assets must be an integral part of the organization's vocabulary and the way the organization thinks. And, only the business side of the organization can assess value and liabilities.

An operational information management strategy is also grounded on the advice and support of information management professionals. The business executes the strategy in close working relationships with information management professionals. For this relationship to work there must be a common understanding of information management areas of practice. Information management is not a single profession, but rather a set of practices. Business needs to have a sufficient understanding of these different areas of practice s to support discourse, to reduce uncertainty, and to support decision making. Strategies are not one time exercises – they are living tools that must be continuously updated to keep in step with the business environment.

BUSINESS STORY: A STRATEGY OF NEGLECT

The Business Environment

This story comes from an organization that fits the diversification model, meaning that there is a diverse base of clients, distinct business processes and a variety of capabilities which make establishing cross-organization business goals challenging. The organization has a tradition of weak top level management – there has been little incentive to change leadership behaviors. The organization has been managed at a process level for decades. Organizational leadership has been by political appointment, and the political perspective has determined which business processes are supported and which are neglected. This creates shifts in priorities and variant business goals over time. Information management practices are not supported by the organization. In fact, because of some historical practices and policies, information is considered a threat to the organization. The organization's files contain information that if accessible to stakeholders would likely result in legal action, and legal actions of significant value. The organization has chosen a deliberate strategy of obfuscation and negligence. Additionally, the fragmentation of budgets and technology solutions across the organization means that policy, legal and financial records may have been treated differently. The current strategy is to ignore the risks and to encourage the scatter of information across locations and divisions. The information management practices and solutions are thirty years out of date. There is one division, though, which has adopted good practice models. This division has had strong ties to private sector industry which has relied on the information generated by the organization. This division has a historical and cultural tradition of strong information management and is a good practice example for many other organizations. The diversification structure allows this division to exist without impact to or from other divisions. However, its isolation prevents it from exerting any good influence across the organization.

The Business Critical Problem

The scatter of information across different environments leaves the organization open to unintended discovery and disclosure. Decentralization also places information in the hands of many individuals with no information or records background. Information is provided in response to public requests for

information, but there is no consistent oversight of what information is made public or how and where it is found. A significant store of policy documents and decision memoranda are discovered and released from a remote location. Current and historical practices are exposed when one of the major clients brings a law suit against the organization.

The Business Response

The legal action opens a legal discovery situation. This forces the organization to identify and provide access to previously unknown sources of information. Organizational leaders fight the discovery motions and attempt to withhold information in the legal action.

The Result

The organization's response is called out in the legal proceedings and the organization is forced to open all of its information sources to special legal review. Neither the original strategy nor the response to legal discovery is in the business interests of the organization as the new discovery results in several additional law suits. In addition to incurring significant costs and exposure, the organization's reputation has suffered significantly. The situation was not rectified until a new management team was brought in and a large number of middle-managers were removed.

A Strategic Approach

The organization might have taken stock of its core business capabilities, identified a strategy for managing information that took into consideration its decentralized structure and localized decision making. The best strategy here would have been to embrace the organizational design, to identify a core IM team at headquarters, and designated IM roles and responsibilities to business locations across the organization. Responsibilities and training should be afforded to those from headquarters. A network or community of IM roles across the organization should be created and supported. Policies should be established that support the full organization, but procedures should be designed to work at the local level.

CHAPTER TAKEAWAYS

From this chapter, you should:

- Recognize the importance of a business driven strategy
- Describe the elements of a reasonable strategy
- Understand the role of information in the four dominant economies
- Understand the four operating environment models
- Understand capabilities and how to identify them
- Describe how the strategy will support your future position in the broader economy
- Describe how the strategy supports your business goals and capabilities
- Describe how the strategy suits the organization's working environment
- Recognize the need to bridge the gap between business and information management

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Chapter 3
The Information Management Perspective

ABSTRACT

This chapter anchors discussion of information management on a comprehensive and inclusive model of the information lifecycle. The chapter also presents a concise account of the history and evolution of the information management profession. As a complex profession, information management is comprised of several distinct but related areas of practice. This chapter considers what each area of practice contributes to the profession and explains how these differences contribute to and enriches a complex culture.

INFORMATION LIFE CYCLE

If we agree that information is a capital asset, it should be managed like other capital assets. Because capital assets are expected to have long life spans, we manage according to their life cycle stages. Managing informational capital assets means anchoring in the information life cycle. A life cycle model describes events in the life of information - from birth to death. There are many information life cycle models, including those focused on information systems development, information technology use, data life cycles, knowledge life cycles, publications life cycles, research life cycles, document and records life cycles, and content life cycles. An integrated model is inclusive in its scope and comprehensive in its coverage of all of these models. An integrated model accommodates different business perspectives and is adaptable to any working environment.

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For the purpose of synthesis and integration, we present a simplified information life cycle model (Figure 1). This model reflects the life cycle stages in many popular life cycle models, including research life cycle models, records life cycle models, systems life cycle models, information management life cycle models, etc. The working life cycle model (Figure 1) include eight stages, including (1) idea generation; (2) information creation and capture; (3) securing and classifying information; (4) organizing and describing information; (5) fining and discovering information; (6) accessing and using information; (7) retaining and disposing of information; and (8) destruction of information. Each area of practice is described below. This life cycle is well known to information management professionals. It is less well known to business professionals. Short descriptions of each stage are offered to establish common understanding.

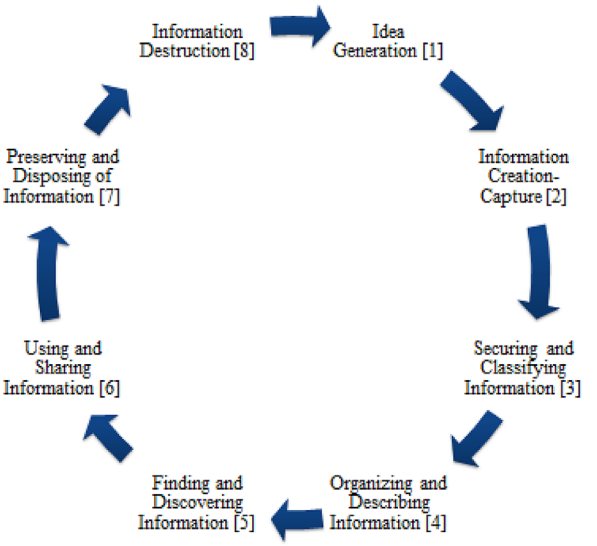
Idea Generation (Life Cycle Stage One)

This stage focuses on tacit knowledge and includes any activity that leads to the generation of ideas. Ideas, their discussion, validation and invalidation are the prerequisite for any and all information assets the organization creates. Ideas which do not move from an intangible and dynamic to a tangible and static form are lost to the organization – they may be among the greatest liabilities. Today, we can leverage communication, social media and collaboration technologies to capture early expressions of ideas, to ensure they are shared with others, and that they take on some digital form. While this stage is critical for deriving value, it is not easily managed or supported.

Information Creation and Capture (Life Cycle Stage 2)

This stage begins with identifying the ideas and knowledge that is created or acquired by the organization. Creation involves putting the idea into a tangible form which may include recording on paper, capturing email, generating content in templates, producing reports, encapsulating compound information assets, or any other method of representing ideas in a tangible form. Capture may also include structuring, linking content to other sources, annotating, editing, translating it into a language other than the source language, revising it to different versions, and formatting it for use in different situations. Capture may also include declaring the information as a record, and labeling copies

Figure 1. Life cycle of information



as convenience. In order to capture information, we must have a strategy for storing information. Storage issues pertain to both individual repositories and storage locations, as well as to the larger landscape of storage options across the organization. Repository management must support all of the remaining stages of the information life cycle. Chapter 8 presents key decision points related to creation and capture, including considerations for different business and working environments.

Security and Classifying Information (Life Cycle Stage 3)

Security and Classification is the practice of preventing unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction of information. The information or data may take any form, e.g. electronic or physical. Information security's primary focus is to balance potential harm and value. Every organization must determine the types of harm that may result from using or providing access to their organization. Harm must be determined while ensuring that value is realized. Security levels are defined and assigned through a multi-step risk management process that identifies assets, threat sources, vulnerabilities, potential impacts, and possible controls, followed by assessment of the effectiveness of the risk management plan. Security classes assigned to information assets are paired with user privileges to ensure that

assets are available to those who need them, and protected from accidental disclosure or discovery by those who are not permissioned. User privileges are often associated with groups of users, depending on roles and positions within or external to the organization. In some cases, though, security may be associated with a storage system or location, or with individuals. Chapter 9 presents key decision points related to security and classification, including considerations for different business and working environments. Chapter 9 presents key decision points related to securing and classifying information, including considerations for different business and working environments.

Organizing and Describing Information (Life Cycle Stage 4)

Information description involves the identification and distinction of information assets. Identification is often grounded on the name or title of the asset, its creator or author, the date it was created, the type of information it represents and the owning or authorizing unit. Description may include the assets subject, its geographical focus, the business function or capability it pertains to, its record series and status, its security classification, or other descriptors that would be important for discovering, using or accessing the asset – descriptions that are important for organizing assets for discovery and use. Description may also include any administrative or preservation actions that are taken to preserve or dispose of the asset at the later stages of its life cycle. Identification and description also involve the creation and registration of metadata. Metadata Management includes activities associated with defining the set of metadata attributes that are required to support the organization's information management and access activities, as well as the selection and implementation of a system encoding scheme to capture metadata. Metadata management also includes defining those reference sources and controlled values that are used to achieve data quality control over metadata values, including filing schemes, subject classification schemes, thesauri, country and region names, records classification schemes, business activity-process schemes, and so on. It also includes operationalizing and maintaining the reference sources for use by the metadata encoding schemes. Metadata management includes the development and maintenance of metadata repositories and the import/export of metadata records to/from the repository. Metadata management also includes the creation of reference models and maps for harmonizing metadata across multiple information management or

business process systems. This stage is rich with standards developed primarily by the library, archives and records management areas of practice. It is also a stage which is supported by a rich set of methods of creating and storing metadata. Chapter 10 presents key decision points related to describing and organizing information, including considerations for different business and working environments.

Finding and Discovery (Life Cycle Stage 5)

Finding and Discovery include two important categories of tasks, specifically those that include 'looking for' information in the larger business environment, and those activities that pertain to searching within systems. How individuals look for information is dependent upon their experiences, their knowledge, their sources and also the type of information they're looking for. To support all the ways that people might look for information, an organization should ensure there are multiple points of access and discovery, including directories, navigation and browse structures, and easy access to individuals, reference services, and search support. Search system creation and maintenance includes the configuration of the search system architecture, definition of searchable fields and search index parameters, search system interface and search results display and presentation, search results sorting and manipulation options, and the configuration of query processing algorithms (e.g. exact and fuzzy pattern matching, Boolean operators, query expansion, etc.). Browse includes those capabilities that allow users to physically navigate through predefined collections of documents. Browse structures may be constructed for any classification schemes defined for a system, where the values have been associated with metadata records for documents. This function also includes the ability to generate search transaction logs and browse transaction logs. Search and Browse also includes maintaining the search indexes and classification schemes to ensure efficient performance of these tools for users. Chapter 11 presents key decision points related to finding and discovery of information assets, including considerations for different business and working environments.

Using and Sharing Information (Life Cycle Stage 6)

To derive value from information it must be used. The use of information is influenced by many human information behavior factors. There are two

fundamental conditions that prevent individuals from using information: the availability of information and the accessibility of information. Availability and accessibility refer to the ways in which the organization and its policies ensure or strive to ensure that stakeholders have the means to find, read, understand, trust, and otherwise use information assets. Availability ensures that the assets are known and findable. Accessibility pertains to the actual use, trust and understanding of the information assets. The first relies heavily on information asset capture, description, organization and discovery. The second is more dependent upon the information culture of the organization – its attitudes toward using, sharing and repurposing information assets – and on a full explanation and accounting of the nature and source of the information. Chapter 12 presents key decision points related to using and sharing of information assets, including considerations for different business and working environments.

Preserving and Disposing of Information (Life Cycle Stage 7)

Preserving and disposing of information begins with identification and administrative control of records. Records are preserved to ensure the continuation of business activities and to ensure that legal evidence, regulatory and financial compliance is satisfied. Records must be authenticated when they are created ant that authentication must be maintained throughout their life cycle. Preservation may focus on digital preservation which may mean the transformation or migration of formats to ensure continued access and availability. Preservation may also focus on protecting physical materials by minimizing chemical and physical deterioration and damage to minimize the loss of information and to extend the life of cultural property. Preservation is distinguished from conservation which addresses treatment to repair damage. Records are those materials that warrant preservation due to their business value. Archives management also contributes significantly to this stage as it is concerned with the maintenance of archival collections and materials. Archival materials may be either digital or physical. Archives management focuses on the acquisition, care, arrangement, description and retrieval of records once they have been tagged for either preservation or disposition. Chapter 13 presents key decision points related to preserving and disposing of information assets, including considerations for different business and working environments.

Information Destruction (Life Cycle Stage 8)

Information asset destruction is a set of processes and methods that may be applied to both records that have outlived their value according to retention guidelines or convenience copies that have no record value. Processes for destruction of materials may include retaining metadata to show their earlier existence, physical destruction, erasure from digital sources or directories, or simply removing references to them in sources. Destruction of information assets may also involve consultation with the business owner. Destruction pertains to both record and convenience copies of information assets anywhere they may exist in the organization. Chapter 13 also covers the key decision points related to the destruction of information assets, including considerations for different business and working environments.

THE INFORMATION MANAGEMENT PROFESSION: HISTORY AND EVOLUTION

Chapter 2 highlighted the importance of the business side of the organization driving and owning the information management strategy. To own and drive the information management strategy, the business needs a foundational understanding of information management practices. This is challenging because there is no single information management profession. Rather it is a set of practices with distinct areas of focus.

This chapter provides a high level overview of information management to help the business navigate the variations. The business needs a basic understanding to (1) see the big picture across all types of information and all stages of the life cycle; (2) to know who to go to for advice and to understand the perspective they take; (3) to understand the key decision points and the consequences of not understanding the issues; and (4) being able to interpret the issues and the advice to fit your organization's needs. Information management strategies are not static – a good understanding of these issues is essential to continuous evolution of your strategy.

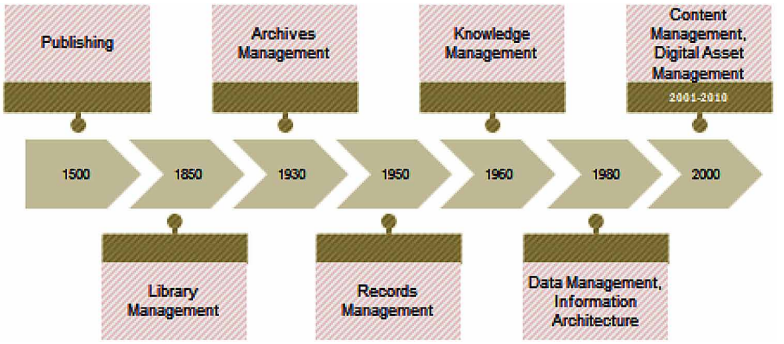
Let's begin with a brief history of information management, and then consider the different areas of practice. When someone says information management, they may be referring to any of nine areas of practice, including data management, records management, digital asset management, archives management, library management, content management, information

architecture, publishing or knowledge management. To some degree, you'd be correct if you referenced any of these, but no one area of practice is sufficient to support all kinds of information or all stages of the information life cycle. Each of these areas of practice emerged at a different time, in a different context and has evolved in different ways.

As a discipline information management is relatively new, but it has a long and evolving history as areas of practice within organizations (Figure 2). The oldest of the practices is publishing which dates back at least 500 years. If we take the modern definition of a library as our focus, library management is a practice that dates back to the mid-1800s. Archives management has been practiced by a formal community for approximately 80 years. Records management and knowledge management are two different practices that have been evolving in parallel over the 60 years. Data management and information architecture are two very different practices that emerged about the same time – 30 years ago. The two most recent areas of practice are content and digital asset management. These areas of practice have common tools and methods, and emerged simultaneously 20 years ago.

Each of these areas of practice is grounded in practice, focuses on a particular type of information, concentrates on selected stages of the information life cycle, leverages tools and technologies, may be supported by formal or informal standards, has education and training programs, and is affiliated with professional societies. The business side of the organization should have a baseline understanding of each of these areas of practice to know who to go to for advice in a situation, and how to integrate and synthesize the variant perspectives across the organization.

Figure 2. History of information management areas of practice



INFORMATION MANAGEMENT AREAS OF PRACTICE

There are nine areas of practice that can claim some relationship to information management. These include publishing, library management, archives management, records management, content management, knowledge management, digital asset management, information architecture and data management. No one of these areas of practice, though, provides a complete picture or full support for an organization's information management needs. Some areas of practice focus on a particular type of information (i.e., digital asset management, publishing, data management, library management, and asset management). Some areas of practice specialize in some stages in the information life cycle (i.e., archives management). Taken together they can provide a full range of support functions for all kinds of information. The challenge for an organization is to leverage the existing areas of support and to find and fill the gaps. Business must drive the strategy – to accomplish this reasonably and suitably business managers should have an understanding of the perspectives they may be offered from information professionals. To this end, we provide a high level overview of each area of practice. Areas of practice are presented oldest to youngest.

Publishing Area of Practice

Publishing is the development of information products for dissemination and for sale to a particular audience. It includes the acquisition, pre-production, *copy editing*, production, *printing*, marketing and distribution of content from an author. This practice is focused on Stages 1, 2, 3 and 5 of the life cycle – particularly the earliest stages of the life cycle. It is less concerned with the late stages of the cycle, with little concern about long term preservation and access. This is the oldest of all of the practices, dating back 500 years. Who can publish has shifted dramatically in the past 20 years due to web and desktop publishing. Its primary information focus is purchased or solicited copy from authors. Those involved in publishing typically have business, marketing or language backgrounds. There is no formal training or certification, though there are many professional societies focused on audience, genre or subject area. There are no formal standards, legal or financial reporting regulations associated with publishing. The dominant information culture is profit or product oriented. Publishing technologies are designed for editors, proofreaders and agents, and include *e*diting applications,

publications management, formatting systems, and peer review systems that handle feedback and versions/revisions.

Library Management Area of Practice

Library science is devoted to the acquisition of formally published materials for the purpose of serving access to information. Libraries acquire materials which have been quality controlled, authorized, formatted and encoded by another agent. Libraries inherit the results of that work typically performed by publishers. In many cases they also inherit the metadata from a publisher. Special librarians may have more skills to adapt and they may have some experience with and responsibilities for informal internal literature and gray literature such as reports. This practice focuses on the middle stages of the information life cycle, specifically stages 4, 5 and 6. Libraries are ancient institutions, though public and open libraries are less than 150 years old. This practice does have a professional training and education foundation. Graduate degrees are required for most practitioners, and some additional certification may be required for school librarians. There are several professional societies supporting this area of practice. There are many de facto and de jure standards depending on the area of practice within the library. These standards tend to focus on the exchange of information with external partners, rather than on internal processes or internal stakeholders. The dominant professional society, American Library Associations, manages accreditation processes for graduate programs. The information culture of this practice is service-oriented and heavily influenced by the dominant social culture of the geographical location. Legal requirements tend to focus on availability of and access to services for stakeholders. Financial requirements focus on accountability to stakeholders. Historically, libraries have been supported by dedicated or generalized integrated library systems. In recent years, though, more generalized technologies have been brought into the library workflow.

Archives Management Profession and Practice

Archives management is the general oversight of a program to appraise, acquire, arrange and describe, preserve, authenticate, and provide access to permanently valuable *unique historical documents or organizational records*. Archives are materials produced by an organization. Records are different than special collections or rare materials, though the two are connected through

preservation practices. Archives management is distinguished from library, museum, and historical manuscripts traditions by the principles of provenance, original order, and collective control to preserve the materials' authenticity, context, and intellectual character. This practice focuses on Stages 3, 5, 7 and 8 – primarily on the end of life cycle management and preservation of unique information. In some situations, records declaration occurs in the earliest stages of the life cycle. However, declaration actions should not be confused with description, organization and classification tasks that pertain to making information available. As an area of practice, archives management is about 80 years old. There are specialized training courses offered by professional associations as well as formal accredited concentrations in library science graduate programs. There are several professional associations devoted to this practice, the most prominent of which are the Society for American Archivists and the International Council on Archives. Archives which represent historical business records may have legal evidentiary and financial value. Protocols and practices for managing print and physical information are well established. The pertinent regulations are based on the organization's economic sector. Because of the preservation aspect of this practice, the information culture tends to be conservative, traditional, protectionist and exclusionary. Archives management technologies tend to focus on digital archive repositories and physical archives tracking and management.

Records Management Profession and Practice

Records management focuses on the management of internally generated information throughout the full *life cycle*, from the time of creation or inscription to its eventual disposition. This includes identifying, classifying, storing, securing, retrieving, tracking and destroying or permanently preserving records. An organization's records represent its business knowledge, evidence of business activities, transactions and decisions. Ultimately they represent its institutional memory. In determining how long to retain records, their capacity for re-use is important. Records management focuses on information that has business, legal, financial and evidentiary value. This practice focuses on all phases of the information life cycle, with lesser attention perhaps given to Stage 6 – access and use. This is a practice that lacks a strong educational or training foundation. ARMA International is the primary professional society for this area of practice. Continuing education coursework is offered by ARMA International, though, the certification does not carry formal educational

credentials nor does it align with a formally accredited curriculum standard. Records managers tend to come from the business side of the organization. ARMA describes this area of practice as being 60 years old. Practice is open to interpretation from organization to organization. There are several relevant standards including ISO 15498-1: 2001 and DOD 5015.2. Of all the areas of practice, records management is most closely tied to legal, financial and regulatory policies. The information culture is more holistic and business oriented than others. The culture is protectionist in nature but not exclusionary. Records managers may tend to affiliate with user groups supported by technology vendors and to develop their communities around vendor conferences. Technologies that support records management tend to be functional modules of document or content management systems

Knowledge Management Area of Practice

There are many definitions and characterizations of knowledge management. Knowledge management focuses on the generation and management of knowledge and intellectual capital. Knowledge and intellectual capital are intangible assets associated with people, communities and organizations. Intellectual capital should not be confused with intellectual property. It is only when knowledge and intellectual capital takes on physical form – whether print or digital – that it becomes information. The reason there are many characterizations of this are of practice is due to its multifaceted origins in economics, engineering, business and computer science. The area of practice is about 50 years old. This area of practice focuses on three stages of the life cycle, specifically stage 1 – the development of ideas, stage 4 – organization and description, and stage 6 – use and sharing. Educational standards are emerging and while some graduate programs exist they are unstable. This remains a fragmented discipline. There are several professional societies at the international and national levels. This area of practice is generally not concerned with legal, financial, evidentiary requirements. The dominant information culture is that one of consulting and trade shows. Individual and large corporate consulting firms have dominated the area of practice. Knowledge technologies tend to focus on collaboration, semantic and text analytics, and social media

Data Management Area of Practice

DAMA International defines data management as the development and execution of architectures, policies, practices and procedures that properly manage the full data life-cycle needs of an enterprise (Mosley Brackett Early & Henderson, 2010). Data management dates back to the 1980s when computer technologies shifted from sequential processing to random access storage. The focus is on structured data, often of a transactional nature. Data management focuses on stages 2, 3, 4, 5, 6, 7 and 8 of the life cycle. It is a full life cycle practice, but relevant to one type of information and its particular challenges. Data management has always been supported by academic computer science courses but has recently expanded to a broader discipline – data sciences. DAMA is the primary professional society. Similar to archives and records management, data management is cognizant of financial, legal and evidentiary requirements. Requirements may be economic sector related or they may have geographical relevance (e.g., state, national or international). The dominant information culture is business-, quality control- and regulatory oriented. It tends to be cautionary and risk averse. This area of practice has the most extensive experience with supporting technologies, including data warehouses, translational data management systems, metadata and metainformation management, business process management, business rules repositories and business rules engines

Information Architecture Area of Practice

Information architecture is focused on the design and presentation of information and the environments in which it is used. It generally includes organizing and labelling websites, intranets, online communities and software to support usability and findability. This area of practice focuses on stages 2, 4 and 6 of the information life cycle. Information architecture emerged as an engineering discipline in the early 1990s and gained popularity in the mid-1990s with the emergence of the web. There are academic programs supporting the practice, though there are not consistent standards governing what is taught. Two important professional societies are the Association for Computing Machinery and the Information Architecture Institute. With the exception of de facto usability and accessibility guidelines, this area of practice is not generally focused on legal, financial, regulatory or standards compliance

Content Management Profession and Practice

Content management is a set of processes and technologies that supports the collection, managing, and publishing of information in any form or medium. Specific practices vary by organizations and mission. Among the most common content management practitioners are news organizations, e-commerce websites, publishers, educational institutions or any organization that produces information for external consumption. Content management focuses on any type of information that is digitally represented. This may include electronic documents, digital audio digital video, digital images, or any multimedia information. This area of practice focuses on stages 2, 4 and 5 of the information life cycle. It is focused primarily on newly generated content and communications. This area of practice is fairly young - less than 20 years old – having emerged with the web and web publishing. There is no formal education or certification for content management. Most training is specific to a content management system and is offered by vendors. There are several large and small commercial vendors. There is no dominant professional society. Rather there are communities and conferences sponsored by vendors. Communities tend to be local and vendor specific. Content management functionality is not designed to address legal, financial and regulatory requirements. The dominant information culture is entrepreneurial and community based. It is characterized by intense development and le**arning among community members.**

Digital Asset Management Area of Practice

Digital asset management is an area of practice focused on organizing, storing and retrieving complex digital media and managing digital rights and permissions. Rich media assets include photos, music, videos, animations, podcasts and other multimedia content. The practice typically involves creating an archive of resources, developing an infrastructure to preserve and manage those resources, and supporting their discovery and access. Digital asset management requires rich metadata because the majority of the resources are non-text objects. This practice may include brand management systems, library asset management systems, and production asset management systems. It addresses all stages of the information life cycle for complex digital content. This area of practice is young, having emerged within the past ten years. Education and training are peculiar to the digital asset management system

used or to the content producer. Large media companies are dominant in this area of practice. Given the proprietary nature of the digital assets, any standards are either proprietary or de facto industry standards. The information culture is dominated by the large media companies, is revenue and intellectual property protection driven. Digital asset management systems may be coupled with content management systems

It is clear that the nine areas of practice represent different perspectives, different practices and focus on different kind of information. A synthesis is a critical success factor for managing information strategically. Choosing any one of these practices ad perspectives over the others will impact how you manage your information assets, and whether that strategy will support you as your business environment and business goals change. Selecting tactics from an area of practice without understanding the variant practices within the stage can have unintended consequences. How do we get to this integrated view?

MAPPING AREAS OF PRACTICE WITH LIFE CYCLE STAGES

Knowing where to go for advice, and how to weigh that advice is dependent on an understanding of how these practices align with the life cycle. Earlier we considered the areas of practice included under the information management umbrella. Let's consider how those areas of practice map to the information life cycle. As we can see from Table 1, some areas of practice cover the full life cycle while others focus on selective stages. Some stages may be supported by multiple practices - perhaps practices which are similar or quite variant.

Life Cycle Stages With Greatest Concentration of Areas of Practice

Each stage of the life cycle is supported by multiple areas of practice. It is important to understand the different perspectives at each stage of the life cycle. Information creation and capture (Stage 2) and information finding and discovery (Stage 5) are covered by more areas of practice than others. These two stages are critically important to deriving value from information assets. Without capture and storage, there are no assets to manage. Without use, no value can be derived. The challenge for creation and capture is that

Table 1. Mapping areas of practice to the information life cycle

Area of Practice	LCS 1	LCS 2	LCS 3	LCS 4	LCS 5	LCS 6	LCS 7	LCS 8
Data Management		XX	XX	XX	XX	XX	XX	XX
Digital Asset Management		XX	XX	XX	XX	XX	XX	XX
Records Management		XX	XX	XX	XX		XX	XX
Content Management		XX		XX	XX			
Research	XX	XX			XX	XX		
Information Architecture		XX		XX		XX		
Archives Management			XX		XX		XX	XX
Library Management				XX	XX	XX		
Publishing	XX	XX	XX		XX			
Knowledge Management	XX			XX		XX		

Legend
- LCS1 = Idea
- LCS2 = Capture and Create
- LCS3 = Secure and Classify
- LCS4 = Organization and Describe
- LCS5 = Finding and Discovery
- LCS6 = Use and Repurpose
- LCS7 = Preserve and Archive
- LCS8 = Destruction

each area of practice has its own methods and principles. At times, these may be in competition. It is important to understand the key decision points and issues before adopting a perspective or choosing tactics. Organization and description (Stage 4) is of interest to every area of practice, but is support by very different methods and structures. While use and repurposing (Stage 6) is of interest to six areas of practice, the audience and the supporting information culture vary widely.

Life Cycle Stages With Least Concentration of Areas of Practice

It is not surprising that the stages with the least concentration are at the end of the life cycle. Preservation and archiving, and information destruction are primarily of interest to data management, digital asset management, records

management and archives management. The challenge here is that each of these areas of practice uses different tools and solutions to achieve their purpose. These tools and methods are not easily adapted to the tools used in the other areas of practice.

Areas of Practice With Greatest Coverage of Life Cycle

Two areas of practice – data management and digital asset management – provide full life cycle support for the information assets they support. This means that these practitioners have the most holistic perspective and are good sources of advice for understanding the implications of decisions and choices. It is logical to look to these practitioners for advice. However, this perspective may be limited because it will not address the broad range of information assets that will generate business value or present liabilities.

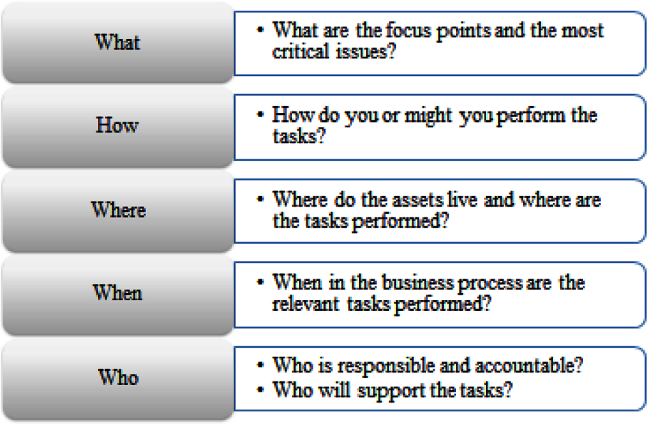
Areas of Practice With Least Coverage of Life Cycle

The areas of practice with the least coverage of the life cycle are library management, information architecture, content management, and knowledge management. These areas of practice have important perspectives, but their perspective will not reflect a deep understanding of all stages of the life cycle. Relying on practitioners from these areas of practice may results in suboptimal management of information assets across their life span.

TRANSLATING STRATEGY TO TACTICS

Managing information assets by stages in the information life cycle is an effective strategy. It provides a foundation for harmonizing and synthesizing perspectives from different areas of practice. It also provides a foundation from which to identify decision points, decision options and key issues, and the consequences of those decisions. Key decision points and issues for each life cycle stage are identified and explained in Chapters 8 through 13. Decision points (Figure 3) explain (1) *what* are the decision points and critical issues; (2) *how* you might you carry out the decisions; (3) *where* the assets live and *where* the tasks are performed; (4) *when* in the business process the tasks are performed; and (5) *who* is responsible and accountable for the decisions and *who* will support or be impacted by the decisions?

Figure 3. Key questions and decision points in the life cycle



A BUSINESS STORY: TAKING THE EASY WAY OUT

The Business Environment

This story represents a mid-sized not-for-profit product and services organization. The internal business environment resembles a coordination model. There is a consistent set of business capabilities which are well known across the organization. Processes are centralized; there are many suppliers and private sector partners, and a well-defined client base. Decisions are made centrally but with significant input from the different business partners. The organization is financed through membership dues and investments from business partners who sell services to members through the organization. Products and services are offered to members. There is a high rate of change the organization's top leadership. High profile individuals from both the public and the private sector have been at the helm in the past twenty years. The approach to information management has complied with financial regulations and requirements, but has varied over time. For the most part, information management practices have been defined by the information technology staff. Because the technical staffs do not have a good grounding in information management, they have relied heavily on external consultants. Every year a new consultant is called in to provide a 'silver bullet' solution to the problems of the organization. The consultants brought in represent the full range of information practices - from records to librarians to content management

people. Because the technical staff is responsible for information management, practices are tied to technology and disconnected from the business.

The Business Critical Challenge

From year to year different information management systems have been implemented. The organization now has five different systems each taking a different approach to managing information and each representing a different stage in the information life cycle. The organization is spending hundreds of thousands of dollars to support all of these systems. A poor decision by the president of the organization leads to a significant financial downturn in the organization's financial position. Memberships are cancelled and revenues are significantly reduced. The financial crisis means that the organization has resources to support only one of the five systems. Each of the five systems is in a different state of completion and none is configured to support the full life cycle.

The Business Response

The organization attempts to solve the problem by acquiring an "enterprise search solution" that will provide access to information in all of the diverse sources. The technology staff chose to implement a taxonomy that was developed years earlier by an external consultant. Taxonomy is high level, generic and has never been texted beyond its presentation to management as part of contract fulfillment. Little attention is given to tailoring the search system parameters to suit the different sources or the organization's capabilities and interests.

The Result

Search is implemented as a full-text crawl with the consultant's taxonomy used as a search interface. The single full text index that is generated is uneven. Search system gives the appearance of working but in fact the results are not a good representation of the organization's information. There is no performance assessment of the results.

A Strategic Approach

A better strategy would have been for the organization to identify a single individual with an interest in IM, to invest in that person and to ensure that person had broad training in all aspects of the IM landscape. Given the centralized nature of the organization, that individual could have taken a slow and steady approach to building an IM capability and practice across the organization. The individual could also have coordinated with the external business partners, and worked closely with the IT team in establishing a plan which could have been implemented over time. This would have to be a person in whom the organization has a lot of trust and faith because the IM strategy will be at some odds with the general organizational culture.

CHAPTER TAKEAWAYS

After reading this chapter, you should

- Understand the evolution and scope of the information management profession
- Understand the many areas of practice that make up the information management profession
- Understand all of the areas of expertise your "whole" information manager might need to know
- Be able to discuss the information life cycle
- Describe sources of expertise for each stage in the information life cycle
- Describe the key decision points for each phase of the life cycle
- Understand the nature and importance of a business focused information management strategy

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Section 2
Designing a Strategy

Chapter 4
Developing Your Strategy

ABSTRACT

This chapter presents a definition of strategy and explains the purpose of a strategy. Strategy design and structure are treated as critical success factors. The chapter also explains that the two most important elements of any information management strategy are a clear vision of the long-term future of information and an honest and accurate assessment of the current information management situation.

DEFINITION AND PURPOSE OF A STRATEGY

There are several accepted definitions of a strategy. Mintzberg (1978) defines strategy as a pattern in a stream of decisions. Von Scheel defines strategy as a set of activities to deliver a unique ix of value – how an organization goes about deciding how to define and operationalize capabilities. McKeown (2013) defines strategy as a method the organization uses to define its future – the organization's way of achieving the desired future with the resources available. Henderson (1981) tells us that a well formed strategy depends on the organization's ability to foresee the future using what we commonly refer to as business and competitive intelligence methods. While the words and emphasis of each of these definitions vary, the core focus is the same.

For the purpose of this book we strategies are critical tools for ensuring that business decisions are aligned with long and near term business goals. Strategies – when well-formed and grounded on broad engagement and buy-in across the organization – ensure that business decisions made across the

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organization are aligned, reasonable and suitable. When a well formed strategy is in place, business decisions - regardless of who makes the decision, where they are located in the organization, or their administrative level resources – will ensure that resources are allocated to achieve short and long term vision.

Strategies are often confused with other management tools perhaps because all of these other tools have 'strategic value'. Annual or quarterly plans are not strategies. Tactics and projects are not strategies. Mission statements are not strategies. Value networks are not strategies. Neither is a simple vision or a detailed business intelligence report a strategy. While each of these methods may play a role in an organization's strategy, they are not strategies. How can you tell whether or not you have an information management strategy? Here are some tell-tale signs:

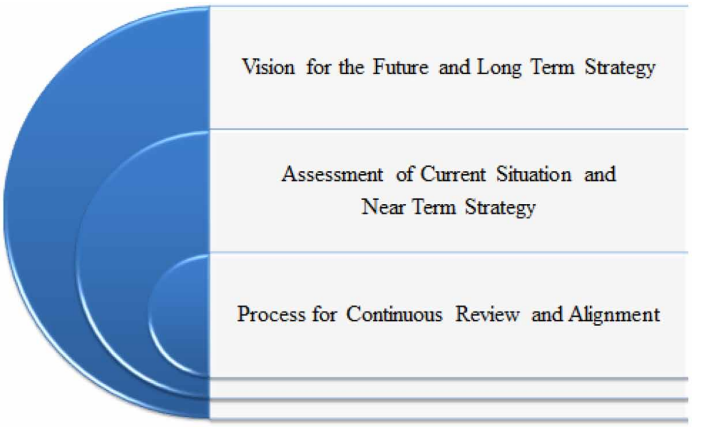
- Do different parts of your organization have different answers when you ask them how they manage their information assets?
- Does meeting a legal discovery order or providing a response to a project audit a major effort which generally results in resources being drawn away from regular business to fulfill the request?
- Have multiple information management plans have been put in place over the years but none have achieved their goals?
- Is information management is a consistent bottleneck within business units?
- Are there multiple areas of information practice in place focused on the same activities, using different and sometimes duplicative or contradictory technologies?

If the answers to these questions were "Yes!" – It is unlikely that you have a strategy for managing information capital assets. What do you need to develop a strategy?

STRATEGY DESIGN AND STRUCTURE

Strategies – in this case a strategy to manage information capital assets – should have three essential components, including (1) a vision of the future and a long term strategy to achieve that future; (2) an honest assessment of the organization's current situation and a near term strategy for addressing deficiencies; and (3) a living process for continuous review of current conditions and their relationship to the long term strategy (Figure 1).

Figure 1. Three essential components of an information asset management strategy



The first component is anchored in an understanding of the future external and internal business environments – what is commonly referred to in the business intelligence literature as a SWOT (Strengths Weaknesses Opportunities Threats) analysis. The external business environment focuses on opportunities and threats to the organization and the organization's actions and reactions in the future. We are focused on the role that information assets will play in defining those futures, and how the organization will leverage information assets to survive and thrive. Envisioning and imagining the future is not a trivial task. Organizations are focused on today and the near term. It is difficult for them to look more than one year into the future. It is also difficult for them to see a future that is more than a linear trajectory from where they are today. Methods and timelines for creating a vision and a long term strategy are described later in this chapter.

The second component of a strategy is an honest and accurate assessment of the current situation, and a near term strategy designed to address deficiencies. Essentially, this part of the strategy should resemble an audit. Just as we audit other types of capital assets, so should we routinely audit our information assets. Most organizations today do not have an accurate assessment of their either historical or current information management practices or an inventory of their information assets. They may have policy statements, project documents, mission statements for various units. They may have a set of principles at the organization level intended to guide decisions and actions. Most organizations today do not have an accurate accounting that can be used to describe the current situation. For this reason, it is best to begin

with a formal information asset audit. Procedures for auditing information assets are in their infancy so expect to define a process that will work for your organization and will be credible and equivalent to audits of other capital assets. Audits should be defined as a repeatable and routine task for gauging the health and management of information capital assets.

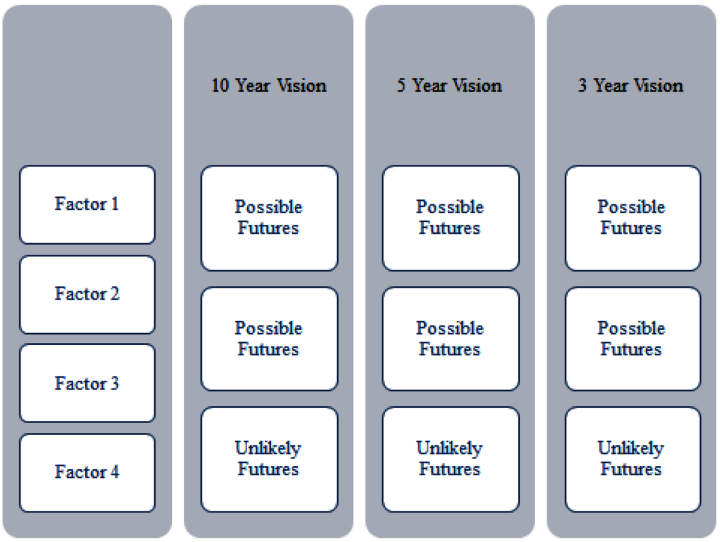
Finally, the third component of a strategy describes how you expect to get from where you are today to where you expect to be in ten years. This component of the strategy should speak to how you will integrate the long term vision and visioning methods, and the near term assessment and auditing methods into day to day decision making. How will they factor into procurement decisions? How will they guide budget formulation? And, perhaps most important – how will you use governance models and processes to advance from today to that future vision.

Strategies may take any number of formats. They may be loosely structured narratives or make use of highly structured templates. Whatever format works best for communicating your strategy to your internal and external stakeholders is the one you should use. Regardless of format, though, your strategy must have three components. Your strategy should make a clear and obvious case for treating information capital assets as business assets. Your strategy should clearly demonstrate that any investment into information capital asset will contribute to the organizations near and long term business value.

STRATEGIES THAT FOCUS ON THE FUTURE

Your strategy should always begin with the long term rather than the near term view. A long term view involves setting expectations for how the external and the internal business environments might change, and how change might affect your organization. Taking the long view first forces you to think about change and to think about the role that information capital assets and liabilities will play in changing that future or in changing your position in that future. Long term strategies are grounded on visions of the future (Figure 2). To develop a long term strategy an organization must define the future. There is no single future, rather there are multiple futures – possible, probable and unlikely futures – preferred, non-preferred and neutral futures. Learning how to discover those futures requires the use of futuring methods. These methods will help the organization to come together around a set of futures.

Figure 2. Long term strategy increments and futures



A long term vision is not a single timeline. Neither is it a progression from today forward. Rather it is a walk back from an imagined future. The timeline is defined as increments of years. We recommend you consider visioning ten, five and three years forward. Envisioning ten years into the future means leveraging the advice of experts, business-competitive intelligence methods and sources, and some challenging futuring methods. Projecting out ten years is largely an imagining exercise – imaging around a set of factors that define a business sector or market. It means breaking out of a current mindset to consider that what we understand today to be impossible may indeed be possible in ten years.

Envisioning five years into the future is a logical result of what you envisioned for ten years hence. What needs to happen or what needs to be in place in five years if you're going to reach that ten year future? Always walk back from the most distant future to the most recent. As you walk back, you'll discover that many more opportunities and threats, strengths and weaknesses emerge. Three and five year visions should be defined around these factors.

The most effective futuring methods include visioning, back casting, forecasting, environmental scanning, trend projection and analysis, and brainstorming. Acceptable but less preferred futuring methods include

modeling and simulations, use case and scenario development, polling and historical analysis. The former are preferred because they are not tied to or embedded in the current situation or current factors. The latter are less preferred because they begin with the present day or they look to the past as a starting point for projection. Chapter 5 provides a deeper dive into these methods to inform your choices.

STRATEGIES THAT FOCUS ON THE CURRENT SITUATION

The second component of your strategy is an honest and accurate assessment of your current information asset management situation. If we were referring to any other type of capital asset we would have an inventory of those assets and likely several audit reports to use to assess how well those assets were being managed across their life spans. Because few organizations have treated information as a capital asset up to now, it is unlikely you will have either an accurate inventory of assets or a formal audit of how they are being managed. And, there are no widely accepted methods or standards for conducting an audit of information assets. Among the most important decisions in defining the current situation is deciding what to audit, how to conduct the audit and how to assess and document the results. These are challenges that have not been adequately addressed in either the information science or the business literature. In Chapter 6 we recommend that organization's focus on business capabilities, and on core operational capabilities in particular. These capabilities have obvious business value which can be inherited by the information capital assets they leverage or produce. Chapter 6 provides guidance in how to design, conduct and report on an audit. Chapter 6 also presents three standard valuation methods. Any audit method you design or adopt should be acceptable and credible to peers who manage financial and physical assets. To achieve a seat at the 'asset management table' your methods and results should be as rigorous as those for physical and financial capital assets. In addition to the general discussions of audit design and conduct in Chapter 6, Chapters 8 through 13 provide a detailed set of questions that may be used to guide the audit.

BRIDGING THE GAPS

You now have a robust description of futures ten years, five years and three years forward. You have a robust assessment of the current situation in terms of how the organization is managing information capital assets across capabilities. You have a clear view of where you have current deficiencies in your current asset management and a clear understanding of the gaps that need to be addressed to meet future challenges. This part of your strategy should focus on (1) filling current gaps and addressing near term deficiencies; and (2) defining management structures and methods for on-going and continuous assessment of future gaps. Current gaps may be addressed through near term plans and projects. Future gaps are dynamic and evolving – only a governance project can effectively address and fill these gaps. Governance processes are discussed in Chapter 7.

ISSUES PECULIAR TO INFORMATION CAPITAL ASSETS

In addition to the three structural components described earlier, information capital asset strategies should consider the peculiar characteristics of information assets described in Chapter 1 and peculiar business perspectives described in Chapter 2. A brief listing is presented below as a reminder of those issues and a check against your strategy (Figure 3). Your information asset management strategy should:

A BUSINESS STORY: THE LONE LEADER STRATEGY

The Business Environment

This story comes from an organization that resembles a unification model. There is overlap between business capabilities and processes are generally standardized in procedural documentation and manuals. There is no centralized understanding of business capabilities as the emphasis has been on similar products and services. Trust is at the local level, between the business and local stakeholders, and between the local business and the corporate business level. However, each local office has their own budgets and has had decision making authority over the technology it uses to support those

Figure 3. Checklist of issues peculiar to strategic information asset management

- ✓ reflect the long term life span and business value of information assets as "things" as defined on the organizations information records series and its retention policies
- ✓ focus on information and not the other forms of intellectual capital which are better supported by distinct strategies
- ✓ address the peculiar investment, accounting and auditing methods pertinent to information capital assets, their unique economic properties, valuation methods and accounting practices
- ✓ focus initially on those assets that have the greatest business value
- ✓ design a solution that fits into the way people work, does not require additional work or work arounds, or extra thinking
- ✓ reflect your vision for information and make it an integral part of how and what you manage for business purposes
- ✓ treat information as a capital asset, describe how value is assigned to information assets, and how you manage this kind of capital
- ✓ should derive from an understanding of asset value and liabilities and describe how information management practices are designed to maximize assets and minimize liabilities
- ✓ acknowledge the role information plays in enabling your business, but should also consider the broader role that information plays in positioning your organization in the information, the networked and the knowledge economies
- ✓ be driven by business needs and owned and lived by business managers who have an understanding of the information life cycle and information management practices
- ✓ reflect and integrate the many perspectives on information to form an organization-wide business-focused and information management enabled information culture
- ✓ reflect value of your information assets and their risks, balance the level of effort expected with asset values and liabilities
- ✓ be designed to support the way the organization works, and does not introduce new direct or indirect costs that do not contribute value to the business, and seamlessly and intuitively fit into the organization's capabilities and processes
- ✓ be grounded on a knowledge of the value and liabilities of each information asset
- ✓ focus on the information life cycle, leveraging good information practices at every stage
- ✓ be flexible and adaptable to meet business demands. the information strategy is first and foremost a business strategy – business demands take precedence over information
- ✓ be grounded on a clear and obvious understanding of your organization's information assets and liabilities
- ✓ be the foundation for and promote the basic values and assumptions of a holistic information culture
- ✓ be designed to meet your business needs and reflects on a practical level the resources that are available to support those needs
- ✓ align with business roles and that those responsibilities can be reasonably absorbed and carried out by anyone in the organization
- ✓ be adaptable and adjustable over time, that it continues to support business needs as those business needs evolve

processes. Decision making is decentralized – each field office develops its own business goals and strategy to support the local markets. The general approach to management has been tactical and focused on near term goals, rather than strategic. Information management practices echo the business approach – generally comprised of a set of generic tactics intended to produce results within a single fiscal year. There is little or no expectation of value to be derived from information assets. From an information management perspective this introduces challenges and risks. The focus tends toward tactics rather than strategy. The tactical and fragmented approach to managing information is further exacerbated by many local solutions.

The Business Critical Challenge

On several occasions in the past three years the organization has been called out when staff from different divisions have given variant advice and guidance to clients. Clients have used the organization's own information to publicly contradict advice given to local customers by headquarters staff. The challenge is the result of the inability of local staff to find information produced by subject matter experts and decision makers at headquarters.

The Business Response

The Chief Information Officer takes a tactical approach. She decides that all of the existing local solutions and technologies will be archived and all of the field offices will use a single new system. The new CIO is a cybersecurity expert with no background in information management. She recognizes the risk of making a decision that is not grounded in some expert advice. For this reason, she hires a high profile external consulting firm to advise her on her choice of system. The firm reviews the top market products with the CIO, makes a recommendation and the CIO accepts this choice. The consulting firm advised the CIO that a single solution would be the best strategy. There is no underlying strategy supporting the choice – in fact the choice in grounded on the consulting company's view of the current state of the market. The choice is not aligned with the organization's business goals, its long term vision or its current situation. The CIO missed an opportunity to develop an information management strategy, and defaulted to a technical and tactical solution.

The Result

The new solution was implemented at headquarters with local – networked – instances installed in each of the field offices. Local offices were not involved in the choice. Each field office was left on its own to learn the system functions and features and to implement it to support their needs. As a result the system was implemented in a way that negated the intention of a centralized system – to enable the organization to share information and to reduce costs. In the end, the cost of purchasing the new system was in the millions of dollars, and the total cost of the implementation was five times that amount. There were also significant opportunity costs – the inclination to manage information independently and locally was reinforced and the opportunity to build a network of information managers was missed.

A Strategic Alternative

A more effective strategy might have been to form a community of information managers across the field offices to discuss the challenges and needs. In addition to focusing on the information issues, the broader network provides an opportunity to learn about different business environments. After the network was formed and had established strong working relationships, the CIO might have charged them to define the long and short term requirements vision for managing information assets. The risks and liabilities associated with enterprise level system procurement are significant even when they are made against a well formulated strategy. Risks and liabilities increase when they are made in the absence of a strategy. To mitigate these risks and liabilities, the CIO should have first pulled staff together to formulate a strategy. Sharing the decision across the division through requirements gathering, transparent review and analysis of options, and a well-explained and documented decision will reduce those risks. In the end, distributed information architecture was found to be a good solution, with loose but core points of integration. Not all field offices had to acquire new technologies, and clusters of offices were able to leverage and develop deep knowledge of the systems they adopted.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Explain the purpose of a strategy
- Distinguish a strategy from other management tools and methods
- Describe the three essential elements of an information management strategy
- Explain why it is important to define the long term strategy first
- Explain why a near term strategy is undertaken after establishing a vision
- Check your strategies to ensure they address issues peculiar to information assets

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Chapter 5
Strategies for the Long Term

ABSTRACT

This chapter is devoted to developing a long-term vision for information management. It explains the importance of understanding the longer view of your external business environment, envisioning role the organization might play in that future, and the role that information plays in helping to achieving that role. The chapter also highlights futuring methods that can help to expose that future and highlights the relevance of business intelligence methods. Components of 10-year, 5-year, and 3-year strategies are considered. Guidance is offered on documenting the vision as strategy.

LONG TERM BEFORE NEAR TERM

By definition managing strategically means managing for the future – managing against a vision of your business. Managing strategically means identifying tactics to achieve your strategy in the short term. A long term strategy is focused on leveraging information assets to achieve business goals in the external business environment and to strengthen the internal working environment of the organization. The long term strategy is built around a long term business vision, expectations for how the business environment will evolve and how competitors and stakeholders will behave (Cornish 1977). A long term strategy is dependent upon a good understanding of the external economic environment and in this case how information assets are changing the nature of the economy.

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It is important to distinguish a long term strategy from other methods. By definition, strategies that are designed around short term tactics are not strategies – they may focus on three or four month intervals or target low hanging fruit. Tactical plans are important for realizing your strategy, but they are not a strategy. Tactical plans may move your organization forward in small increments, but they may also have unintended consequences or generate liabilities if they are not linked to and assessed against a long term vision and strategy. Tactical plans will not help an organization to survive or thrive in the changing economic landscape of the 21st century. Additionally, a long term information management strategy is *not* a maturity model. Maturity models are tools to help you measure progress along a linear trajectory. Evolving business environments do not follow a linear trajectory. Long term information management strategies are not information technology strategies. Information technology is an enabler and it will be a factor in how the environment changes, but it is only one of many factors.

The most important characteristic of a long term strategy is that it describes and focuses on the future. Painting a vision for the future is not a trivial task. It is most difficult for those who are *doing the business* today. It is critical for those who are *doing the business* today to be able to see the future. There are three common mistakes organizations make in developing a long term strategy. All three result from the business' inability to see a future that is beyond their current understanding. The first mistake is to take a simple use case scenario to describe a linear trajectory from today or the recent past. This strategy focuses on small and logical changes to a future environment and produces a positive, probable near term view of the future. This is an insufficient context for a long term strategy. The second mistake is to see the future from the perspective of the sector or market as it exists today. Common business intelligence tools teach us to look at the existing players, to consider their current positions and what actions or events might lead to different positioning within the market. This is another short term view of the future. It does not take into account the way that sectors and markets are shifting – not only at the top or among the primary players but from the bottom up or from the inside out. Again, the mistake here is to begin with an insufficiently rigorous view of the future. The third mistake and one that is often combined with the first two is in assuming that there is a single future and that such a future is a positive and probable one. A long term strategy is a response to the business' vision for the future. How do we overcome these limitations to define the future? What are the factors that will influence the

future? What are the events that might create chaos or throw the future into disarray?

UNDERSTANDING THE FUTURE

Before we can develop a long term strategy we need to understand what the future can be. The long term strategy must be anchored in and a response to your expectation of the future. In the 21st century we are experiencing several great transformations. All of these transformations align with the shift from an industrial to a knowledge economy. The speed of change is exponentially more rapid than it was in the 20th century. One thing is clear about the economic transitions we're experiencing – markets are being entirely redefined. The boundaries of sectors and markets are shifting and new players are moving into these spaces. It is no longer sufficient to analyze how the top players will behave in the future. As community groups tackle negative externalities, they define new markets. New markets may complement or supplement existing markets. New products and markets are generating new economic assumptions and new economic rules. Your visioning exercise must include these improbable and unexpected events. Your visioning exercise needs to describe futures that are unlikely and improbable as well as possible and positive.

What do you need to know to create this vision? Where do you begin? You need to begin with a few basic assumptions. First, the future is about change. Change is a given – we can assume that the future will be different than the present. In an industrial economy we came to expect linear, predictable and logical change. When we think of change most of us probably envision a straight line leading forward into the future – one that is a result of the actions we take today. While time always advances, trends and transformations – particularly in the 21st century – take the form of cycles with unpredictable ends. This is because the world has become a more complex place. It is challenging to understand complexity and to see how many factors can work together to create a future we did not anticipate. Complexity means that it is hard for us to reduce all of these factors to a single rule or structure to support our understanding. In developing a vision of the future, many organizations tend to take one or two factors and project forward. You need a vision of the future that begins with the premise that the future will be complex and chaotic. Begin any visioning exercise with four basic assumptions. First,

the future is not certain – it is imagined and projected based on a complex set of factors. The people engaged in creating the vision should be able to suspend their knowledge of the current situation and use their imagination and creativity. Second, there is nothing certain about your vision – there are possible, probable and improbable futures. By taking a logical linear trajectory you will only see the possible future. This will put your long term strategy at risk of failure. Third, there is no single vision of the future because any of the factors that might influence the future have positive, negative and neutral scenarios. Most organizations sketch out only a positive view of the future. This leaves the organization vulnerable and it masks opportunities to reshape or redefine the business environment. Finally, assume that the future will be chaotic. Chaotic environments are those in which a very small input can have a long-term effect on the overall environment. It is difficult to develop strategies for chaotic systems, but that is the reality of the business environment in the 21st century.

FUTURING METHODS

What can you learn from the work of futurists to develop your vision? Futurists believe that a simple one-dimensional or single-discipline orientation is not satisfactory for creating this vision. Futuring methods can help you create a vision of the future. Without a robust visions of the future your long term strategy will in fact be a near term plan. The goal of futuring is not just to predict or describe the future, but to try to improve the future direction and outcome. There are several methods for exposing and imaging futures, including methods which are preferred and methods which are acceptable. Preferred futuring methods include visioning, scanning of the business environment, trend analysis monitoring and projection, scenario development, futures wheels and relevance trees, and back casting. Acceptable but less preferred methods include modeling and simulations, polling and brainstorming, and historical analysis. Brief descriptions of these futuring methods are provided below. Citations to more extensive discussions of these methods and their results are provided at the end of the chapter.

Visioning

Visioning is the systematic creation of visions of a desirable future. It was first used in a professional context by Robert Jungk (Jungk & Müllert, 1987). Jungk developed a series of futures workshops which were structured around three phases, including: critique phase, fantasy phase, and implementation phase (Dator, 1983). Jungk's reference to a fantasy phase is exactly on target because effective visioning must involve imagination. A fully developed set of futures depends on our ability to fantasize what might be. Lippett (1983, 1998) refined the visioning methodology for the Apollo Space Project to distinguish preferred futures. Preferred futuring consists of several steps including a review of the organization's common history, brainstorming what's working and what's not, identifying those underlying values and beliefs to retain, identifying events, developments, and trends that may have an impact or lead to a preferred future. The Institute for Alternative Futures visioning methodology also focuses on a preferred future. However, it begins with a statement of current problems and first looks to the past rather than focusing on and imaging a future in a chaotic and complex business environment. While visioning can be an effective method, its success is entirely dependent upon the organization's ability to create that imagined and creative future vision, and to create a shared vision. The vision cannot be the vision of one or two individuals. The business must believe in the future visions they've created for this method to work. Moving from the vision to its realization is the challenge because the vision is a dream or a fantasy if it is done well. Visioning is a method that may be best combined or supported with other methods including back casting.

Scanning

Scanning is often used at the beginning of a futuring exercise. Scanning focuses on major trends, issues and ideas across a wide range of activities. It is a systematic survey of current information – note the emphasis on the current situation. Scanning includes assembling and reviewing a wide range of information – business reports, newspapers, magazine, expert or industry leader discussions, and research – anything that is an indication of

changes that are likely to effect the business environment. This is a common business and competitive intelligence method. While it has value for futuring exercises, its limitations are that its primary focus is on current and near term. In assembling a set of information to work with, you should make sure you include information that is imaginative and fantasy in nature. This is difficult for business because business it may seem like a frivolous use of resources. However, remember that futuring creates the vision – and the long-term strategy focuses on meeting business goals in those futures. Scanning can providing important insights into factors that may contribute to the future. Again, this method may be best used in conjunction with others.

Trend Analysis

Trend analysis is the practice of collecting information and attempting to spot a pattern, or trend, in the information. It is the examination of a trend to identify its nature, causes, speed of development, and potential impacts. Although trend analysis is often used to predict future events, it could be used to estimate uncertain events in the past

Trend monitoring starts with the premise that trends are important for understanding and guiding the future. This method believes that trends should be carefully monitored and reported on for key decision makers and futurists. Trend Extrapolation involves projecting past trends into the future, for some given period of time. Trend extrapolation assumes that the future will in some way be an extension of past trends - this perhaps made sense in an industrial economy or even a high tech economy. It is not clear this assumption holds in a knowledge economy. Trend analysis and exploration can provide important insights into the factors that may contribute to that long term future. By themselves, though, trend analysis and exploration will not create that long term vision you need to ground your strategy.

Scenario Building

Scenarios lay out the trends, strategies or wild card events that may be inherent to a story or narrative about the future. They define a possible sequence of events that could happen in the future, based on certain initial conditions or assumptions and what could occur. Futurists often construct at least two or three different scenarios about the future to ensure that different alternative futures are exposed. If you use the scenario approach, you should be prepared

to create best case-positive scenarios, worst case-negative scenarios, and neutral scenarios. Scenarios should also include possible scenarios, probable scenarios, unlikely scenarios, and impossible scenarios. Given the chaotic and complex nature of our 21st century business environment, impossible scenarios may in fact represent what happens in the future.

Forecasting

Forecasting is the process of predicting the future based on current trend analysis

There are two methods that can be useful for forecasting, including futures wheels and relevance trees. A futures wheel is a form of structured brainstorming that aims at identifying and packaging secondary and tertiary consequences of trends and events. A trend or event is placed in the middle of a piece of paper and then small spokes are drawn wheel-like from the center. Primary impacts and consequences are written in circles of the first ring. Secondary consequences of each primary impact are derived forming the second ring. The ripple effect continues until there is a clear picture of the implications that the event or trend can have. Futures wheels are effective brainstorming tools – they can quickly help a group to identify some of the first, second and third order consequences of an event. The caution here is that everything follows from the event in the center of the futures wheel. If you miss an important potential event, the value of your futuring exercise may be diminished. Relevance trees are an analytical technique that subdivides a large subject into increasingly smaller subtopics. The relevance tree takes the form of a hierarchy that begins with a high level of abstraction and moves down with greater degrees of detail in the following levels of the tree. It is a powerful technique that helps to ensure that a given problem or issue is broken into comprehensive detail and that important connections among the elements considered are presented in both current and potential situations. Again, the challenge here is to be sure you identify an important problem.

Back Casting

Back casting is the most effective futuring method but it is the most difficult for businesses to work with. Back casting begins by defining a desirable future and then works backwards to identify conditions and factors that must be addressed in order to achieve that future. This methodology was

most effectively used by NASA. The challenge is to define that future focal point – that desirable future that goes beyond what anyone thinks is possible today. Back casting works best when the focus point is thought to be entirely impossible but is the optimal end game. An example of a focal point for a transportation future might be a future where there are no physical constraints on individual mobility. Assuming you have arrived at that future, walk backwards to today to understand what problems you had to solve in order to get to that point. Back casting approaches the challenge of discussing the future from the opposite direction and perspective. The true value of back casting is that multiple futures emerge as you pull the threads on the factors that contributed to that impossible future. Back casting is a methodology that should be a part of any futuring exercise. It works well with many other methods, particularly after you've teased out factors, conditions and dependencies.

Models and Simulations

Models provide us with the opportunity to use one thing – a model – as a substitute for something that is difficult or impossible to experiment with. Simulation models are used to represent some factor or entity and to consider how that factor might behave in different situations and under different conditions. Computer models combined with simulation processes can be used to represent multiple possible scenarios of the future

These methods allow us to model complex factors and experiment with different characterizations of each of these factors. Models and simulations can also help us to see the effects of our own business actions. We use models and computers to support this type of futuring – particularly for factors whose scale and scope are difficult for humans to perform due to the natural limits of our mental capacity. The challenge with this methodology is that we must rely on humans to identify and model the factors. As with other methods, models and simulations are best used in combination with others.

Polling

Polling is one of the most frequently used methods. If you use this method, you should be aware of its inherent limitations and constraints. Essentially, polling involves consulting with experts. The pollster identifies the experts and pulls them together to consider questions individually and independently. We bring together a group of experts who have some knowledge about the

trend or a problem and we listen to their collective wisdom about the future. One of the best well know of these methods is the Delphi Method (Helmer & Dalkey, 1963). The point of the Delphi method is to improve the process of obtaining objective expert opinions. The Delphi works through several rounds to explore questions from many angles and to discover the core ideas and areas of consensus. It maintains anonymity throughout all rounds. It is very time consuming and expensive. The results are entirely dependent upon the ideas of experts who are selected for the exercise. Essentially, this is a visioning exercise among experts. The Delphi method focuses on probable or preferred futures. We poll the experts about the events they think are most probable or preferable and when they are most likely to occur. Polling also includes the reasons for their answers. The results are summarized and fed back to the experts in subsequent rounds of consultations. It is important to ground any polling exercise on that fantastical and imagined future.

Future Histories

A future history is a postulated history of the future. We construct an imagined or a fantastical future and proceed to write the history of how we accomplished that future. Future histories are similar to back casting exercises, though there is an implicit assumption that a future history can be written by an individual. Future histories can also include alternative history that assume an events or events at a point in the past – referred to as a Point of Department (POD) – turned out differently. Alternative histories elaborate a fictional history from the Point of Department to the present and beyond. Fictional histories can be important for helping individuals to break out of a focus on the present business environment.

Gaming

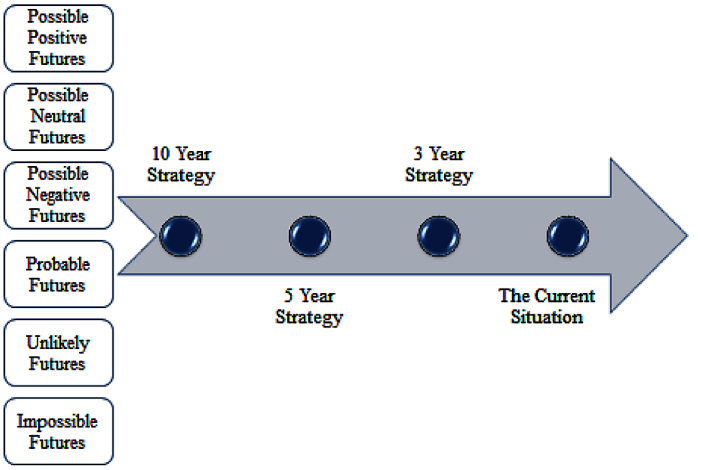
Gaming has received a lot of intention in the business and computer science literature in the last ten years. Gaming is an attempt to take certain variables from reality in some area and create a computer model or game situation in which one can see how those variables might interact with each other over time. It often leverages models and simulations but gaming can also be used in simple human role playing. Gaming allows us to play what if games that allow us to see the consequences of our choices. This method is most valuable for testing tactics. It can be an important futuring method for assessing the strategies and tactics you've identified – after you've defined that set of futures.

STRATEGIES FOR FUTUE BUSINESS ENVIRONMENTS

Assuming you've leveraged one or more of these futuring methods you should not have a set of futures to work with. You are now ready to begin to define your long term strategy. There are two components of your long term strategy. First, your long term information management strategy must demonstrate a clear understanding of the future external business environment. It must also explain how you will leverage information assets to take advantage of opportunities and threats in that external business environment. Perhaps the most important question for long term strategic planning is the expected rate of change in the external environments. If your business operates in different national or regional or even local environments where change is occurring at different rates or having different results, what will this mean for your strategic plan? How will you consider these different rates of change? What futuring methods will you use to ensure you have accurate pictures of those different environments? Is there a single future, or are there multiple futures in your business environments? Second, your long term information management strategy must also explain how you will leverage information assets to build internal business strengths and to manage or mitigate weaknesses in these changing environments. Consider how your internal working environment will need to shift to survive in that future external environment. How will your internal structure and configuration need to adapt and shift to keep pack with that external environment? What does this mean for the key questions and decision points called out throughout the life cycle? How will changes that you make to the internal business environment influence the external business environment?

Both the external and internal long term strategies should speak to a set of rolling timelines. You should be prepared to develop at least three long-term strategies – 10 years hence, 5 years hence, and 3 years out. Your 10 year strategy represents a real shift in the role you expect information capital assets and liabilities to play. This is a creative exercise intended to encourage engagement and innovation among your staff. It is highly likely that the actions of others and your own actions will shift things so radically in the next ten years that anything you project will hold. The purpose of this ten year strategy, though, is to create a mindset that breaks out of your current or even near term thinking. The 10 year strategy is grounded on a future that leverages back casting and future history methods. The 10 year strategy presumes there are multiple futures and speaks to approaches that

Figure 1. Components of a long term strategy for managing information assets



are suitable and reasonable to any one or all of those futures. Think of the 10 year strategy as a compendium of what works across all those futures, the approaches that must be in place to address the worst case scenario future, the neutral and best case scenarios.

The 5 year strategy represents a critical step in the journey to the 10 year future. The 5 year vision is not just an intermediate linear stage from where you are today. The starting point for your 5 year strategy is your 10 year strategy. As you work backward you should be prepared for multiple factors and conditions to emerge. Some of these factors may be actionable sooner rather than later. By addressing these factors you take a step towards changing the future. As these factors appear and are discussed new problems and new solutions will present themselves. The 5 year strategy makes use of several of the methods we discussed above, but particularly back casting.

The 3 year strategy is simply a nearer term version of that long term strategy. Like the 5 year strategy, the starting point for your 3 year strategy is not the present situation but the 5 year strategy. The closer you come to the current situation in your visioning the more likely you are to generate ideas that you can address in the near term. This provides a rich set of opportunities to address in your near term strategy. This approach also provides you with a different perspective of your current situation.

Many organizations assume that a long-term strategy projects one to the next fiscal cycle. In fact, a strategy that projects out one year is one that focuses on addressing strengths and weaknesses in the current situation. In

all probability, auditing and assessing the current situation will take a year to complete.

Strategies for future business environments – whether they pertain to the external or the internal business environment – should always project out to the most remote future first. Work backwards from those futures to three years hence.

DOCUMENTING THE LONG TERM STRATEGY

It is important to define the structure of your long term strategy before you begin. Do not assume the strategy will be a simple 3 page document. The long term strategy should include a description of the futures you envision, an accounting of the methods you used to derive that vision, and a backwards timeline from the most distant to the nearest future. An accounting of the vision and its derivation are important tools – as you move forward expect to consider your actions against that future. As you monitor events in the external business environment, update your futures. Your long-term strategy should have at least three components – one for the 10 year strategy, one for the 5 year strategy, and one for the 3 year strategy.

Beyond these essential components, choose a structure, format and communication style that best suits your organization and for the audience you're targeting. We hope this book will be useful to many different types of organizations. The long term strategy is not just a tool to be read by top level managers and administrators. The long term strategy should be reviewed and updated on a regular and rolling basis. A strategy is not a final document to be filed on the shelf or on a network. It is a living business document.

Consider structuring your strategy as a simple description of results of the visioning experiments and conclusions for timelines – first the external environment and then the internal environment. You might consider shifting the details of the visioning experiments to appendices. If you take this approach, be sure to document enough details in the body of the strategy to support review and updating in the future. Make it clear in the body of the strategy that the environments are continuously changing. Your strategy should clearly lay out the timelines for reviewing all components of the strategy. Organizations that are thriving in the knowledge economy may review their long-term strategies as frequently as every three months. Your strategy should speak to who will be involved in the review, the sources that need to be consulted and the preferred methods.

A BUSINESS STORY: A SHORT SIGHTED STRATEGY

The Business Environment

Over the past 30 years, a large private sector corporation has had significant financial resources to devote to technology. The corporation is international with teams stationed on all continents. The large technology budget has resulted in a proliferation of tools across the enterprise. The burden to the centralized help desk to support all of these tools has become overwhelming. The Chief Executive hears of similar challenges from his colleagues in the sector, and learns that the current approach to dealing with these problems is to bring in a Chief Information Architect (CIA). A CIA is hired and is charged to develop a long term vision and strategy for information management. While the CIA is well versed in information architecture, the organizations he worked in have been in different economic sectors and different business contexts. Specifically, his most recent experience is in a public service organization with a very traditional culture and a relatively stable trajectory. The organization's external business environment experienced significant changes twenty years ago but has been stable of late. The CIA is not accustomed to working in an organization that competes in a highly dynamic external business environment.

The Critical Business Challenge

The organization has developed a long term vision based on the good work of its internal business and competitive intelligence division. There is a good understanding of how the environment is likely to change over the next five to ten years. This vision, though, has not been interpreted in terms of information management. The CIA is under pressure to interpret the vision and develop an information management strategy to support it. The CIA develops a strategy – based on his experience and knowledge – that focuses on information systems. The CIA had an extensive background in technology and application architectures but a weaker understanding of information. The CIA runs the strategy by his information technology team. The scenarios he offers presume a stable market of systems and vendor. The scenarios do not take into consideration changes to information products, services, competitors or consumers.

The Business Response

The scenario the CIA presents is grounded on the future visions of the current set of vendors active in the market. His strategy is to standardize the organization's information management applications around a product suite from the leading vendor. He rationalizes that the vendor will continue to be interested in an integrated suite and an expanding market that keeps us with customer demand. By taking this direction, the CIA has assigned the long term vision and strategy to the vendor. What the vendor defines for the majority of its clients will determine the organization's future. The move to a vendor suite of products means a loss of functionality for several stages in the information life cycle. Specifically, the preservation and disposition stage of the life cycle is put at risk because the vendor's suite lacks critical support functions, and does not meet industry standards. The access and availability stage is sub optimized because the search architecture is an older product licensed from a third party vendor. This product has less functionality than the search product the organization was using. Security capabilities also are insufficient to protect documents that might intentionally or unintentionally leave the organization and be subject to disclosure. The security classification options do not align with the organization's levels of risk and harm. Organization of information assets is constrained because the functionality has been ported over from the vendor's social media product. The depth of organization is significantly different for these two kinds of information. In addition to the loss of functionality, the migration of information from existing applications to the vendor suit results in a significant loss of project-related data. The migration strategy did not involve a back-up or roll back option because it was executed by a third party routinely hired to manage the vendor's projects.

The Response

The poorly aligned solution results in such a significant loss of functionality to force the organization to fire the CIA. The loss of data is not formally acknowledged but over time staffs begin to notice gaps in historical information. Having spent the entire available budget on the vendor's product suite, the organization was forced to make the best of the situation. A team of developers were brought on board to build add-ons and work arounds to supplement the vendor's functionality. Over time the enhancements were unsustainable as the vendor upgraded and updated their products.

A Strategic Approach

The CIA might have taken a more effective approach by first reviewing the organization's long term vision, by consulting with key business leaders throughout the organization to understand how the vision was developed, and by establishing a good working relationship with the business and competitive intelligence experts. Having established a good understanding of the organization's future scenario, he might have drafted a preliminary and draft interpretation of the vision as it pertains to information assets. He might have asked key business leaders and the business intelligence experts for comments on his draft vision. Have established a vision that supports the business and the business' understanding of the future, he might present the vision to his direct reports. At this point, he is confident he has the backing of the business – what he is sharing with his direct reports is a low-risk and high-value vision. At this point he and his team are well positioned to turn the information management vision into an information management strategy.

CHAPTER TAKEAWAYS

After reaching this chapter, you should be able to:

- Distinguish between a long-term strategy and a near-term strategy
- Explain why it is important to have extended views of the future
- Explain why it is important to have multiple views of the future
- Describe the range of futuring methods, their advantages and limitations
- Explain the difference between a vision of the future and a long-term strategy
- Define the rolling increments of a long term strategy
- Design a structure for a long-term strategy that suits your organization

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Chapter 6
Strategies for the Near Term

ABSTRACT

This chapter focuses on developing a practical and accurate assessment of the current information management situation. The chapter explains how to formulate and conduct an information audit that is business-relevant, credible, and trustworthy. The chapter also considers how to document and communicate the audit results to the business.

THE CURRENT SITUATION

Most organizations do not have a single coherent information strategy. Most organizations regard information as a by-product of a process or as a non-capital resource. As a result, there is not a consistent inventory of information capital assets. Nor is there a good practice that can be adapted and adopted across the organization. Additionally, information assets are likely to be treated differently across a life cycle stages and across business processes. It is important to have an honest and accurate accounting of how information assets are currently managed across their life cycle and across the organization.

This book makes the case for treating information assets as capital assets. The starting point for managing any capital asset is an understanding of the organization's stock of those assets, periodic audits that describe the health of those assets and knowledge of how they are managed across their life spans. This chapter considers how to design, conduct and report on the results of an information capital asset audit. Before launching into an audit process, though, we recommend that you gain a basic understanding of the current

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information management landscape. You can develop an understanding by asking a few simple questions...

- Is there a single or are there multiple information related strategies?
- What is the scope and coverage of those documents?
- Is there overlap across strategies?
- Who owns these strategies? Who is responsible for them?
- Is anyone using them for decision making?
- Has any one of these strategies been used for planning or investment?
- Are there information governance models and processes across the organization?
- Who currently owns or is responsible for managing the organization's information?

The answers to these questions will give you a general sense of the current situation. The knowledge you gain from asking these questions is not sufficient to develop a near term strategy. This knowledge will help you understand how your organization treats information capital differently than physical or financial capital. This knowledge will guide you as you design, conduct and report on a more formal audit.

DESIGNING A NEAR TERM STRATEGY

Your near term strategy should focus on improving the current management of information capital assets. This component of the strategy begins with a description of how assets are managed across their life cycle and across the organization. Every organization is complex when it comes to information assets because they are so pervasive. The challenge is to focus on those information assets that have the greatest value to the organization. Information assets of greatest value to the organization are those that are either inputs to or outputs of core business capabilities. These capabilities have the greatest business value to the organization. By association, these information assets have the greatest value to the organization. The near term strategy asks how these valued assets are managed across their life cycles. The information capital asset audit is a method for documenting how these assets are being managed.

While the audit produces important information, it does not constitute a near term strategy. It simply provides the knowledge we need to develop that near term strategy.

INFORMATION CAPITAL ASSET AUDITS

What is an information asset audit? An audit is a systematic examination of the resources, consumption, production and management of these resources over the course of their life span. Bright describes an audit as the collation of an inventory of information resources or assets used in a given working environment. There are no standard auditing methods devoted to information capital assets. This means that we will need to translate those auditing methods applied to physical and financial resources before we can apply them to information capital. Regardless of the variations, the purpose of all capital audits is the same -- to identify, assign value to assets, and to be sure that you're managing those assets appropriately. Audits are diagnostic tools – they help us to discover, check, verify and control the use and production of resources by an organization (Botha & Boon, 2003).

Designing an Information Capital Audit

Audits of other kinds of capital have established procedures that guide and in some cases prescribe the design and conduct of an audit. This is because these types of capital are acknowledged to have value to the business either as a factor of production or a business product. We don't yet have this same level of comfort with information capital assets. For physical capital, we have extensive asset inventories with detailed information about their condition, age, market and replacement values. For financial capital, we have balance sheets which are maintained on a continuous basis and used to generate reports on the financial health of the organization. Audits tell us about the health of these capital assets often by assigning a value and explaining whether that value is being realized. When assets are not generating value they are likely a liability to the organization. The simplest goal of any business strategy is to realize value and to minimize liabilities.

The first step in completing an audit is to define what we want to audit. As Bright suggests, in order to conduct an audit we need an inventory of the organization's assets. A balance sheet will cover an organization's full

financial capital. And a physical capital inventory will identify all of the organization's physical assets. It is unlikely that we would be able to identify all of an organizations information capital. We likely do not have such an inventory – so we'll need to create or identify a substitute. If you are serious about strategically managing your information assets, this will be the first of many audits you'll complete.

The starting point for an audit is a consistent, comprehensive and inclusive asset framework. Even though you will never audit all of an organization's assets at one time, you should expect to audit at least 80% of them over time. If you do not have a consistent framework, your audit results will not – as accountants say – tick and tie together. While this framework does not provide the equivalent of a balance sheet it will provide a consistent way of characterizing and valuing information capital assets. We should start with core or operational business capabilities and identify those assets that have the most value or the greatest potential liability.

Your first attempt at an audit should focus on those information assets which have the greatest value to the organization – based on the value of the business capability they support – and those that are in greatest need of improved management. Think back to the capability model (Figure 4) we presented in Chapter 2. Focus on those information assets that are inputs to the capability and the information assets that are produced by the capability. Outputs should include those assets created for both internal and external consumption. Use your information asset framework as a reference document.

Conducting an Information Asset Audit

Once we've identified the capabilities and the information assets we want to audit, the next step is to identify sources of evidence for the audit. Sources of evidence are what we will collect and examine to determine the state of management of assets. We look to the business owners of a capability to identify sources. Information Audit can be carried out at various levels within an organization using different methods that are suitable to the kind of information asset we're auditing. Auditing methods may include surveys, interviews, observations, examination of documentation, system level reviews, reviews of business process or workflow diagrams, or simple inventories of sources.

However, you should take care to ensure that any method you choose produces a complete picture of the information assets used. Additionally, none of these sources will shed light on the actual life cycle management of those assets. This is where a deep understanding of the life cycle stages and their key issues is important. The audit will be guided by the business owners and custodians but it will likely be executed by information management professionals (Botha & Boon, 2003; Buchanan & Gibb, 1998; Buchanan & Gibb, 2008).

Are there good sources for tracing the life cycles of information assets? There may be reliable sources for particular types and formats of assets such as structured data or complex media assets (e.g. digital asset management). Recall the fragmentation and conflicts across areas of practice highlighted in Chapter 3. You should expect your first – baseline – audit to define investigative methods and to identify reliable sources. It will be as important to document how you conducted this first audit as it is to document the results of that audit.

Some organizations have used survey or Delphi methods as a quick substitute for a thorough audit. While this may highlights areas of the life cycle that need attention, it does not provide the rigorous asset baseline you need to develop a near term strategy. It is important to take the time to develop these methods and to engage the business in the process. The business side of the team needs take ownership of the near term strategy and the audit that describes the current situation.

While the ideal audit will focus on core business capabilities and the assets that support them, it may be necessary to design and test your methodology on a smaller sample. Large scale projects can serve as good test cases for experimental audit methods.

Once you've identified your audit target, defined your sources and methods you will need to establish some protocols for assembling an audit team. Financial and physical asset audits are generally supported by external teams of independent experts. Until you have a rigorous baseline and an established asset management strategy, you will not be in a position to bring in external experts. Taking that approach will be high cost and likely ineffective. Most of the billed time will be devoted to defining the targets and finding the evidence. You will pay twice for these tasks because external teams cannot do this without the support of internal staff.

While the targeted capabilities and the sources of evidence present challenges, the audit team's questions are always simple and straight forward. We want to know whether the information capital assets….

- That support these capabilities are available when they are needed?
- We say we're using are the ones we're actually using?
- Are actually being used as we state they are?
- Are being managed across the life cycle in a way that creates value or generates liabilities?
- Are consistently and effectively managed within a life cycle stage across capabilities?
- Are balanced across a capability – in other words there is neither over nor under investment in specific assets?

Answers to these general questions are good starting points but they are not sufficient for developing a business-driven and practical strategy. The detailed questions presented in Chapters 8 through 13 will help you to identify strengths and weaknesses at each stage of the assets life cycle. The answers to these questions will tell you what you need to know about the state of intellectual capital assets for that capability.

Assessing the Management of Assets

At this point you have a good sense of which assets are well managed and which are in need of additional attention. The standard result of an audit is a cover report summarizing the conclusions of the audit team and the team's recommendations for corrections, backed up with extensive appendices that describe the methods used, sources of evidence and examples that support the audit conclusions. You should expect to produce something similar from your audit of information assets. A single audit, though, does not give you a full picture of how information assets are being managed across the organization. Let's assume you have conducted multiple audits of capabilities and have a set of observations across the organization. These observations are a good starting point for developing a near term strategy.

The near term strategy should focus on those capabilities and assets in need of improvement. The near term strategy should focus on assets and their life cycles – a shift in perspective away from individual capabilities which may cross technologies and administrative units. How do we communicate these challenges to the business? How do we position the information management professionals to develop solutions? We need a simple way of communicating these complex results. You should use the communication style and format that your organization prefers. One approach that has been effective is what we call a heat map. This is a simple presentation of areas of focus, color coded

to represent areas of strength and weakness. This approach aligns with our SWOT analysis and is a presentation format understandable to business staff at all levels of the organization.

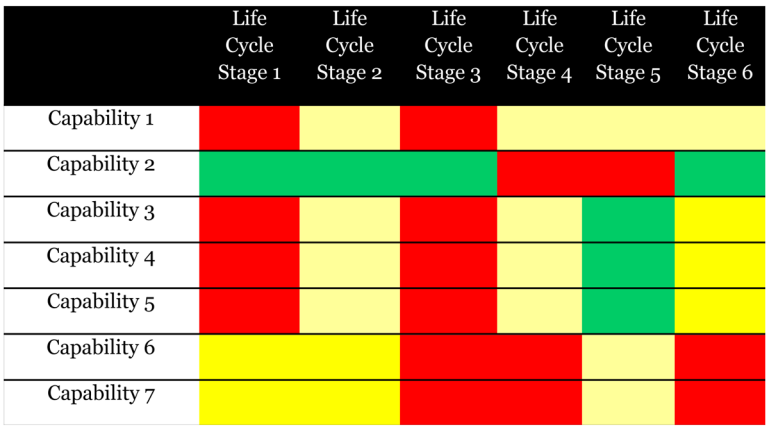
Figure 1 presents the results of several audits to give the business owners a high level picture of strength and weakness. Practically speaking, each capability should have its own heat map. A capability based heat map should have its own balance sheet. This is a working tool for business owners to use to ensure that information asset value and liabilities are balanced at that level.

Assigning Value and Liabilities

Your audits will provide the information you need to develop a near term strategy. They should also give you the information you need to develop an accounting of the value of those assets to the organization. As we noted earlier, with the exception of information assets generated for external markets, value will likely be inferred from the value of the capability they support. If the asset is being used to create a new highway in an emerging economy, the value of the asset at that point in time is determined by its contribution to the success of the project. Similarly, if the asset contributes to a liability that causes the project to fail or perform at a lower than expected level, the asset should also inherit some of those liabilities.

Because of the economic properties of information described back in Chapter 1 assigning value to information assets can be challenging. The reliability and credibility of your valuations will increase over time as

Figure 1. Heat map of information asset management in core capabilities



you test different approaches. We offer two pieces of advice. First, begin with the asset framework used in the audit. Second, consider the economic properties of the assets in the framework and propose a valuation approach that is suitable to each type or category of asset. We recommend that you begin with a set of value and liability categories rather than attempt to assign actual dollar values to any single or any group of assets. Remember that one of the economic properties of information is that it can be used repeatedly without being diminished. This means that the same asset may be used in several capabilities and at different points in time. Its actual inherited business value may be situational and cumulative. You will need to have a broad understanding of how assets are leveraged over their life spans. You may not be able to determine its true business value until you've completed a series of audits or completed multiple audits of a capability over time.

The life span of an information asset – what we refer to in this book as an official or record copy of an asset may be anywhere from 5 to 40 years depending on the nature of the business. Financial projections or market reports may have shorter life spans if the markets demand changes daily or quarterly. However, the life span of the underlying data for those reports and projections may be 100 years. Understanding life span is important because assets are typically expensed according to their respective life expectancy and life cycles. Tangible information assets should have an identifiable or an indefinitely useful life. For guidance on life spans business managers should look to the records managers in their organization. However, we note that the business value and life expectancy of individual series of assets – record series – are determined through collaboration between the business and information professionals. If you do not have record series, you will not have a reliable basis for determining information asset life spans.

Valuation Methods for Information Capital Assets

In his book on Making Sense of Intellectual Capital, Daniel Andriessen identifies twenty-five published methods for improving the internal management of intellectual capital. These methods include valuation, performance measurement, accounting, and human resource management. Of interest to us at this stage are the three methods Andriessen calls out for assigning value to information assets. The three methods are (1) the cost approach; (2) the market approach; and (3) the income approach.

The cost approach derives from the economic principles of substitution and price equilibrium. In the cost approach the utility value of the asset is equivalent to the value of the service that the resource can provide during its life time. This approach is similar to what we advocated earlier – assigning value based on the business value of the capability the assets supports.

The market approach derives from the economic principles of competition and equilibrium. In the market approach we assume that the value of an asset will be determined by its available supply and demand. The experience characteristics and public good nature of information assets make this a challenging approach. Some variation of this approach can be applied to formal information products that have either a physical or digital form. We cannot, though, ground our market value on scarcity – a core economic concept. Information assets do not lend themselves to the same definition of scarcity as do other physical or financial assets. We cannot assume that scarcity will play a role in achieving price or value equilibrium in this case.

The income approach derives from the economic principles of anticipation - the current value of expected income generated by the asset. In other words, the current value is predicated on its ability to produce business value or revenue for the organization in the future. In a non-, not-for or community based organization, revenue projections may not be a primary economic tool.

All three of these methods are reasonable approaches to assigning a value to information assets. However, none of them will meet your needs without adaptation. And, it is important to note that none of these approaches addresses liabilities. Assets may generate value and they may produce liabilities. The approach you choose to assign value should be equally adaptable to calculating the negative value of a liability.

DOCUMENTING AND COMMUNICATING THE CURRENT SITUATION

The current situation consists of a statement about the strengths and weaknesses of your information assets. You audits will surface issues pertaining to individual capabilities and products. To manage information assets, though, organizations should be prepared to routinely report on the state of the organization. At a minimum such a report should be issued annually. Ideally, it is issued quarterly to coincide with other asset management reporting practices. Such reports should address the current state as well as progress against any

plans to address deficiencies and weaknesses throughout the organization. Your reports and communication strategies should align with and be seen as comparable to those issued by financial and physical property managers.

BRIDGING THE GAP: TACTICS AND METHODS

At this point you should have a long term strategy that projects the external business environment out 10 years, 5 years and 3 years. You have a sense of where the environment might go and what that future might mean for your organization. You've run positive, neutral and negative scenarios against a probable future. You should also have an accurate picture of the current state of your information assets and an understanding of where there are gaps in the current management of those assets. You are now in a position to perform gap analyses.

What is the most effective way to perform a gap analysis? In forming the future vision we worked backwards from 10 years. The gap analysis should be performed going forward from today to the 3 year vision, then to the 5 year vision and finally to the 10 year vision. Continue to focus on capabilities, their assets and the life cycles of those assets. What gaps are the most critical for the most important capabilities? Are there gaps across capabilities that pertain to the same assets? If you fill the gaps in the 3 year vision, what impact does that have on the 5 year vision?

The gap analysis and its outcomes should be an institutional process. Solutions to gaps should be extensively reviewed and critiqued to ensure that they create value and mitigate liabilities. Gap analyses should produce solutions that can be implemented at the project level. However, projects need to be aligned with the near and long term strategies. One way to ensure gap analyses are aligned with those strategies and move toward that future vision is to anchor them in governance models and processes.

A BUSINESS STORY: THE EXPIRED STRATEGY

The Business Environment

The context here is a public agency where policy is established centrally but interpreted to suit the local needs. There are many policy statements

and documents, but there is no organization-level strategy for managing information. Over the years, the information management has been characterized by tactical responses to new policies and regulations. These responses have been interpretations of the organization's leadership. This means that at some points in time the emphasis has been on web content and intranet content, at others on procurement and financial information, and at others on regulatory and research data. The lack of a strategy has prevented the organization from addressing the information management problem. The organization has been the target of recent law suits and has realized the challenge they face in finding information to respond to requests for discovery. Additionally, the public expects greater access to public information and the organization is now receiving a steady stream of requests. Many of these requests can only be satisfied by accessing information that is only available in a regional office.

The Business Critical Challenge

Responding to public requests for information and to legal discovery requirements is taking a lot of staff time. The organization has had to hire five new staff to help track down information. Turnaround times are still too long. And, in many cases the information they needed to respond has been destroyed or cannot be found. The business executives realize that they need an organization wide strategy to get a handle on information assets. The chief executive issues a directive to assess the current situation and to develop a comprehensive strategy. The team interprets this directive as a tactical request. They conclude that the solution to the information management problem is to centralize the management of information across all offices and locations. They hire a new manager to oversee the project, including centralized information management training and a standardized set of procedures to support all stages of the information life cycle. An individual is hired based on his credentials awarded by a records management association.

The Business Response

The new manager assumes that information management training is consistent across all organizations. Training modules are prepared and delivered across the organization. The records schedule was adopted as the primary information taxonomy. An internal system which has good information management

support processes is chosen for organization-wide implementation. No audit or inventory of information assets was undertaken. No requirements or analysis of regional office information management needs were assessed. All field offices were expected to align their practices with the historical records schedules and generic records management training.

The Result

The records management strategy and the records schedules approach is geared towards protection and preservation – an approach that is not well aligned with public access and discovery. The responsible manager did not understand the mismatch in solutions to problems and the project continued until it was clear to everyone that it would not succeed. The project was not a success and no near term strategy or understanding of the organization's information management needs was achieved. In fact, the project failure had unintended consequences in that it tarnished the organization's willingness to undertaken another similar effort. This damaged the organization in the near and the long term. It created a negative image of information management professionals and reinforced the belief that local control was less risky. The existing situation remains in place but with significant new challenges.

A Strategic Approach

A better approach would have been for the initial team identified by the chief executive to conduct an internal outreach to all locations and offices. The outreach might have focused on understanding current needs and issues. The outreach might also have identified core business capabilities with the greatest information challenges and value across all offices. An information audit of core business capabilities could be conducted at a few locations. This initial audit would generate a common working framework for other audits to follow. The groundwork for developing a near-term strategy would have been established, and there would be champions throughout the organization to speak to its credibility and practicality. In an organization which has seen a high rate of change and variant priorities at the top levels, a stable foundation developed and supported by practitioners is a critical first step.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Describe the current landscape of information management strategies across your organization
- Describe the components of an audit
- Explain how information capital audits are both like and different from physical and financial audits
- Design an audit of your core operational capabilities
- Identify sources of evidence
- Assemble an audit team
- Conduct an audit across the information asset life cycle
- Identify gaps in management
- Compare the audit results to the long term strategies

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Chapter 7
Governance Models and Methods

ABSTRACT

This chapter presents a definition of governance and a discussion of the purpose of governance. Traditional governance models are described. The chapter explains the components of strategic governance models and methods, including the importance of linking governance to decision making. Finally, governance is considered in the context of the information management lifecycle.

DEFINITION AND PURPOSE OF GOVERNANCE

For the purposes of this discussion, let's define governance as the authority to define strategy, set policies, establish standards, and to make decisions which can be enforced, and to influence the actions of individuals or institutions to achieve a goal or objective (Kooper Maes & Lindgreen, 2011; McManus, 2004). Information management governance is a complex topic. Governance methods describe how the governance process is called into play, where the sources that are used to govern come from and who creates them, who is involved in the governance process, who makes decisions and how they are made and communicated, how decisions are enforced, and whether there are any opportunities for feedback and input on decisions from beyond the governance group members.

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STRATEGIC GOVERNANCE OF INFORMATION ASSETS

Governance is essential to managing information capital assets strategically. Governance is what makes the vision of the future, the near and the long-term methods come alive. Governance is what ensures that strategic management of assets is sustained over time. A good information capital asset governance process answers two critical questions – what is it that needs to be governed and how? A good framework builds understanding and adoption across the organization. It also supports the information culture. A good information capital asset governance framework

- Aligns with the business goals
- Leverages the vision of the future
- Reflects the way the business works
- Addresses tactics and projects at the capability level
- Is designed to address key decisions at each stage in the information life cycle
- Embodies and enhances the information culture of the organization

We are interested in ensuring that existing decision making processes take into consideration the strategic management of information assets. We also are interested in ensuring that any decisions about information management assets are made strategically. How do we design a governance system that accomplishes these two goals? The answer is a system that is triggered by organizational decision making and routine audits and reviews, a process that reviews issues against strategies, and one that produces and enforces decisions consistent with near and long term strategies. Let's walk through the inputs, processes and outputs of a good governance framework. This model (Figure x) is a generic representation of all the components of a governance model. Every practical governance model is a variation of this generic form. As you read through the inputs, processes and outputs consider how they play out in your environment. For each of the three components, we highlight some of the most important issues.

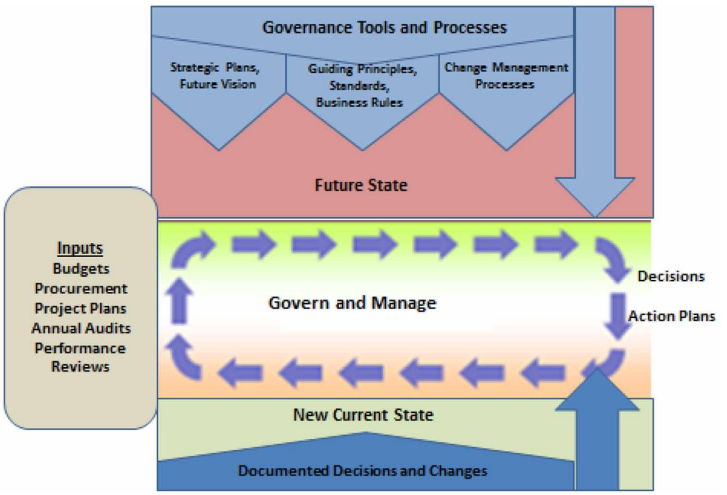
Governance Inputs

Inputs can include routine actions that trigger normal management review processes, including budget proposals, software development proposals, project status reports, procurement decisions, process change proposals, technology upgrades or replacements, workforce development strategies – any business decision that has any kind of an impact on how the organization manages information capital assets. Inputs should also include any information that describes the health of information assets or the performance of information management methods, including annual audits of information assets, information security reports, search logs, information technology health or cost reports, proposals for changes to information management processes, proposals for introduction of new technologies or changes to business processes.

Governance Processes

Governance processes are represented by the circular process in the middle of the model. As the model suggests, processes are the heart of governance. Processes are always undertaken in the current state – but with a view to the future state. We begin the process by determining what kind of an outcome or output is expected – is it a decision, an approval of an action, a review of a project status and advice, or guidance on a change to process? Is the

Figure 1. Governance model: Inputs, processes, outputs



governance group empowered to disapprove or reject a proposal? Or, is their authority limited to only advice and guidance? If the group makes a decision for which it does not have enforcement authority, what happens to the decision if it is not accepted by the relevant manager? What happens to the confidence in the group if decisions are not enforced or advice offered is not taken? The process also includes consideration of the scope and nature of the authority of the governance group. Ideally, the governance group is comprised of individuals who have the authority to make and enforce decisions. What is the process for authorizing the decision? What is the process for communicating the advice and guidance?

Regardless of the expected output and outcome, the process begins with information from the individual or the unit triggering the governance process. What is required to trigger the process? Is it a routinely scheduled review? A review of a routine management task such as budgeting or capital asset investments? Is there a single group of individuals conducting governance? A core group with experts called in as needed depending on the focus? What process does that group follow? Are they allowed to ask questions and to expect answers? Is a file created with all of the submitted and created documentation? Who does the governance group consult, and how do they identify those individuals? Is the group comprised of experts from around the organization to ensure outside consultation is not needed? Or, is there a second tier membership of experts who are alerted to a relevant case before consideration begins? Does the governance group have a Chair? Are there support staff assigned to the group?

What sources does the governance group consider in making a decision or offering advice? Of course, an effective governance group will have both a near term and a long term strategic plan to consider. This is critical because any action taken by the governance group will result in a change to the current situation and the near term strategy. Depending on the nature of the action there may also be a change to the long term strategy.

Governance Outputs and Results

Outputs and results of the governance process include, decisions and advice to those who are bringing the questions or issues forwards for governance, changes to proposed projects and plans, updates to strategies and future visions, and updates to all of the inputs used in the governance process.

TAKING STOCK OF GOVERNANCE PROCESSES

Every organization has one or more governance processes. Some governance methods are more conducive to the strategic management of information assets than are others. There are five basic governance methods discussed in the literature and in play in organizations today. These include (1) top-down; (2) bottom-up; (3) center-out; (4) silo-in; and (5). The governance models in place in any business environment are likely to be variations of one of these models. Your governance models have likely evolved over time to reflect your internal working environment and your information cultures. The descriptions below touch upon some of the internal working environment configurations described in Chapter 2. For example, we discussed where decision authority is assigned and how decisions are made, whether there were organization wide, local or no standards. To that discussion, we now add questions of how the future vision, the near and long term strategies are considered when decisions are made.

Just because you have governance in place does not mean that the triggers, the processes or the resulting decisions and guidance are strategic. The most important question for governance is – is it strategically aligned with your vision of the future or are you simply making decisions based on short term needs and operational factors? If your governance models are not strategic, what can you do to change or enhance them? As a mental exercise, call to mind some specific decisions that were made in the past - what do you know about how those decisions were made? Were those decisions documented, or were they simply made on the fly as directions to staff? If the decisions were documented do you know how those decisions were made? Do you know who made them? Do the people who were involved represent those who are accountable responsible, supportive, consulted and informed? Were the decisions made by a few individuals? Did these individuals have the competencies and the knowledge to make these decisions? What was your method for identifying stakeholders for the governance process? And, perhaps the most important questions – what was the result of these decisions? Did they add value to the organization and move it towards its near or long term strategic goals? Or did they result in failures and generate liabilities for the organization? Would the decisions have been different if they had been subject to a rigorous governance process?

Governance Models

Let's review the five basic models. As you read through each description consider where you might find any of these models in your environment. Keep in mind that you are likely to find more than one model – depending on the organizational level and the nature of the working environment.

Top-Down Governance Method

In this governance method, all of the governance processes are grounded on authority patterns. The policies, standards, decisions and future visions are made by top managers and leaders. Decisions and guidance are communicated down through governance groups to the organization. Governance groups communicate decisions to those involved in doing or supporting the relevant work or task. Governance decision enforcement is predetermined. Leadership decisions have compliance structures that enforce decisions. Decisions are not open to debate, but may be open to interpretation in how they are implemented if there is not good coordination amongst all the parties.

In this model, how do we ensure that the near and long term strategies reflect the visions of every level and every core capability in the business environment? How do we make sure that decisions and guidance are grounded in and aligned with the near and long term strategies? In this context, it is critical to involve top leadership in the creation of those strategies and in the visioning exercises. Creating governance groups in local units or within core capabilities is unlikely to result in strategic decisions or organization-wide enforcement of those decisions. In this context perhaps the only way to ensure that your strategies are operationalized is to ensure the leadership supports an open and consultative information culture. The old business adage – culture eats strategy for breakfast every time – is particularly relevant to this governance model.

Bottom-Up Governance Method

In this strategy, governance processes and decisions evolve from everyday experiences and work programs and move up through the organization. Policies, standards, decisions and future visions might be made by different players in the search space. This model represents a somewhat informal approach to governance. In this strategy, compliance is not an issue – decisions are

implemented at the local level. This approach to governance only succeeds where the tools and resources are well maintained and easily accessible. Additionally, for this strategy to succeed, there need to be clear linkages between the top level governance group and all those who implement the decisions or interpret policies. The danger here is that policies will be made for individual work units or individual applications and the information capital asset strategy will be reduced to a static paper document. This strategy can only work when there is widespread understanding of and buy in to the long and near term information capital asset strategies.

Center-Out Governance Method

In this strategy governance is heavily reliant on experts throughout the organization. Business expertise, expertise in different stages of the information life cycle, or expertise in certain technologies tends to dominate the decision making process. In this strategy, decision processes begin with advice from experts rather than a broader management perspective. This strategy can work effectively if the governance process involves a thorough review and discussion from all stakeholders across the organization. Ideally, this strategy involves an open evaluation of options and alternatives with transparent peer review processes, and consideration of the expert advise against the near and long term strategies. The challenge here is the nature and sourcing of the experts – are they called in from the outside? Are they brought in from other units or locations? Are they part of the units? Do these experts have a stake in the end result and impact, or is their reward in the form of a short term financial reward (e.g., consulting). The other challenge with experts is whether their opinions are accepted throughout the organization and whether there is buy in for the decisions. In this model, it is important to ensure that governance decisions are backed up by leadership. Stakeholders are needed to enforce decisions, particularly if there are challenges engaging leadership. This governance strategy must be supported by a clear and widely accepted change management process.

Silo-In Governance Method

This governance strategy is similar to the bottom up strategy in that the process pulls people from the various business units into the process – as appropriate – to consider the issues and to make decisions. For this strategy

you must have clear and visible authority assigned to the governance group by leadership - otherwise the authority will appear to reside only at the business unit and not the organization level. This strategy would benefit from having a broad based governance membership any one of whom can be called upon to render an opinion or give advice as needed. One of the challenges of this model is the potential lack of organization-wide perspective among the members. It is critical that the near and long term strategies, and the long term description of the future, be known and subscribed to by any member of the governance group.

Every organization can find one or more of their governance practices in these models. An awareness of how you currently make decisions and govern will help you to see where you may need to adapt or enhance current practices to improvement your strategic management of information assets.

Governance and Decision Making

Managing information assets strategically means making our strategies and our visions come alive through routine and everyday governance. We need to make sure that governance is integrated into decision making processes. We need to make sure that information management strategies are well represented in governance. For example, in the development of a new application, the governance process must be aligned with stage gates and be triggered by pre-defined questions. The value of governance and of the near and long term strategies are increasingly valuable as the development cycle progresses.

Governance in the Information Life Cycle

When the governance model is invoked in the review of any decision or change we need to ensure that consideration of information management issues is thorough and consistent with the near and long term strategies. The key questions and decision points highlighted in Chapters 8 through 13 will ensure comprehensive and thorough consideration of impacts to information capital asset management. These questions should not only serve to review any decisions that may impact information assets, but they should also be considered as key inputs to a governance process. Consider how your organization is answering these questions and making these decisions today. Is it a good process? Does a review of the current situation in any of the life cycle stages suggest a need for an improved governance process?

It is also important to remember that each of the nine areas of practice we described in Chapter 3 has its own governance models, systems and strategies. Governance processes need to consider these different perspectives. The review process, though, should result in identifying and leverages the best practice for the context. .

A BUSINESS STORY: THE MISSED OPPORTUNITY

The Business Environment

This story comes from a medium sized consulting firm of financial and accounting experts. The organization is comprised largely of internally recognized financial experts and accounting executives. The business environment resembles a replication model – across the areas of expertise there are few shared clients and many custom developed financial products and services. While there is a common technology base, every organization has its own applications and its own budget for managing information. Information is highly sensitive, so holding it close and not exposing it to others has been sufficient justification in the past for not having an organization wide solution. The CIO has established a governance council but the council is comprised of programmers and engineers. The council is more of a discussion group than a review and decision making group. Decisions have no weight or authority because the members of the council have no decision making authority. Governance decisions are made by individual managers in the units and pertain only to the unit. There are no information management standards or guidelines. Decisions are implemented haphazardly or not at all. Stakeholders are not represented on the governance council.

The Business Critical Challenge

The organization's security is breached by external hackers from a foreign country. The core economic models, investment strategies and financial data are accessed. The after action review of the situation demonstrates that there was no way to determine the nature and sensitivity of the information that was accessed without going item by item into the areas that were hacked. There is a general sense of what was exposed, but only a lengthy review process will determine what was accessed.

The Business Response

As a result the CIO forms an information management team to propose a set of standards and guidelines which the governance council can use in the future. The information management team develops comprehensive models of IM processes, reaches out to the business to engage in the process, prepares decision points in each process, and ties decision points to stage gates in the software development and implementation process. This process is the dominant process across the organization, so the IM team considers this a good anchor point for ensuring that their guidelines are considered. They also propose to the governance group that there be a designated IM expert assigned to every project that moves through the process so there is some assurance that the issues will be addressed. The proposal, the models and all of the decision questions are submitted to the CIO.

The Result

They proposed information management classification remedies are presented to the IT governance group but because they have no background in information management, there is no follow-up or follow through to implement the recommendations. The situation does not change. The level of frustration among the IM team escalates and several of the leading experts leave to take other positions. The IM team must be re-affirmed and refreshed.

A Better Strategy

A better strategy would have been for the CIO to take the opportunity of the hacking to reconstitute, reauthorize and strengthen the governance group, to expand its mandate beyond simpler scope of IT to include business stakeholders and IM experts. A group of individuals with decision making authority, and also the trust of the business managers would build the respect and the implicit authority of the governance process throughout the organization. The CIO might also have proposed to take as learning opportunities the testing of the new IM guidelines on any new project coming through the group for approval. The IM guidelines – accepted initially as drafts – could then have been adapted and updated to meet the needs of the organization. A year after

the incident, the organization would have had a full function governance model in place. The visibility and the benefit of governance likely would have resulted in greater investments in the IM function, and in the working relationships between the information, business and technology experts.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to…

- Define and describe the purpose of governance
- Explain how governance relates to near and long term strategies for managing information assets
- Describe the essential components of a governance model
- Describe the types of governance models in play in your organization
- Understand what is needed to strengthen existing governance models
- Understand how to integrate near and long term strategies into governance processes

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Section 3
Operationalizing the Strategy

Chapter 8
Creating and Capturing Information

ABSTRACT

This chapter focuses on the creation and capture stage in the information lifecycle. The chapter identifies the key questions to answer in formulating an information strategy. Concepts associated with these issues and the consequences of ignoring them are explained. The issues are also interpreted in different internal operating environments and in the context of future business environments.

CREATING AND CAPTURING IN THE LIFE CYCLE

This stage begins with identifying the ideas and knowledge that is created or acquired by the organization. Creation involves putting the idea into a tangible form which may include recording on paper, capturing email, generating content in templates, producing reports, encapsulating compound information assets, or any other method of representing ideas in a tangible form. Capture may also include structuring, linking content to other sources, annotating, editing, translating it into a language other than the source language, revising it to different versions, and formatting it for use in different situations (Boiko, 2004). Capture may also include declaring the information as a record, and labeling copies as convenience. In order to capture information, we must have a strategy for storing information. Storage issues pertain to both individual repositories and storage locations, as well as to the larger landscape of storage

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options across the organization. Repository management must support all of the remaining stages of the information life cycle. Chapter 8 presents key decision points related to creation and capture, including considerations for different business and working environments.

KEY QUESTIONS

Chapter 8 provides a deep dive into the key questions and decision points of the create and capture stage of the life cycle. We offer 39 more specific questions intended to guide your thinking. The questions also form the basis of an audit of information assets. An audit should ask and answer all of the questions listed in this chapter. From these answers you should be able to judge the strength or weakness of assets in this stage of their life cycles.

These questions are organized into five easy to remember categories to help you work through them as you work on your strategy. We do not offer answers to these questions because only you can determine which answers best suit your environment. There is no single right or wrong answer. Short explanations are provided for key concepts as background and context. These explanations also serve as a working reference source for both business and information professionals.

The What Questions

Your strategy should explain …

- What kinds of information have business value for your organization?
- How will you manage compound information objects, or items that are made up of or have linkages to other information objects? Does your strategy specify how these kinds of compound objects should be treated?
- How will you manage content that is chunked, or content that is pulled from existing information assets and used to create new assets?
- Do you generate information in series or create and issue information serially? If so, how will you track and manage items that are issued over time as part of the same compound object?
- Do you redact content and create renditions of original assets? If so, how will you treat renditions in your strategy?
- Will your strategy address the creation or prevention of copies?

- Do you have information redundancy due to a proliferation of copies? If so, how will you manage this redundancy in your strategy?
- Will your strategy include guidance for identifying and designating official record copies and convenience copies?
- Is your information encoded and if so what standards or structures do you use?

The How Questions

Your strategy should explain how…

- To use of persistent unique identifiers? What standards will you follow and how will you manage them?
- To establish file names?
- folders are created and structured
- To establish titles for documents? Will it include conventions and placement of titles or unique names within the object?
- Establish directory or folder structures across the organization? Within applications? Will units be allowed to define their own folder structures?
- Create and associate authorship and ownership properties with information assets?
- Capture information assets – manually, using automated methods or by default?
- Use information compression methods for storing content?
- To store structured, semi-structured and unstructured information?
- To select formatting standards for storing active and inactive information assets?

The Where Questions

Your strategy should explain…

- Which applications and repositories are designated as official sources of information?
- What content will be managed where? Will there be guidelines for which assets should be filed in which systems?
- The use of network drives for storing information?
- The use of workstations for storing information?

- The use of flash dries for storing information?
- The use of transactional systems as certified information repositories or systems of record?
- The storage of archives? Will archival copies be store in active systems or will they be moved to a permanent and dedicated system?

The When Questions

Your strategy should explain when

- Content should be captured (i.e., at the time of creation, when a final version is designated, when it is archived, etc.)
- Versions are tracked and how they are tracked?
- Minor and major versions are designated?
- The official record copy is designated and how it is marked?
- A final version is designated and how it is designated?

The Who Questions

Your strategy should explain who

- Is responsible for capturing content?
- Is responsible for deciding where content will be filed?
- Is responsible for designating content structures?
- will declare content official or convenience
- will establish the folder structures
- Is responsible for managing content for a business unit?
- Is accountable for these tasks?
- Should be consulted and informed of matters related to content capture and storage?

CONCEPTS AND CONSEQUENCES

The concepts referenced in the key questions are explained below. The explanations are intended to be concise and pertinent to the development of a strategy. They are not intended to be comprehensive or academic treatises on the topic.

- Information Types
- Unique Reference Identifiers
- Compound Information Objects
- Chunked Or Partitioned Information
- Renditions
- Information Series
- Information Serials
- Redundancies and Duplicative Information
- Close and Partial Copies
- Information Versions and Editions
- Official Copies
- Structured, Semi- and Unstructured Information Assets
- Convenience Copies
- Encoding Schemes and Standards
- Certified Information Systems
- Network Storage Drives
- Workstation Storage
- Flash Drive Storage
- Transactional Systems of Record
- Manual Information Capture
- Automated and Default Information Capture
- Information Naming Practices
- Information Titling Practices
- Folder Structures and Filing Instructions
- Information Compression Methods

Information Types

For the purpose of this book, information is defined as the substance of content of an object. Not unsurprisingly, there are several different perspectives on types of content. We highlight these perspectives because they are present in every organization and because it is important to integrate them into an organizational perspective. The technology perspective focuses on MIME or Media Type (RFC 822) which in fact describes the format in which the content is represented. This typology serves an important function because it provides standard instructions for rendering and displaying content at all of the stages of the information life cycle. The library perspective focuses on the resources, media and genre. In library applications, resource types

are managed by the MARC 21 metadata standard. In that context resources describe the form through which a work is expressed. The values are a mixture of format, media and resource type. Additionally, the library perspective reminds us to consider owned content (i.e., content created internally) and acquired content (i.e., created by someone beyond the organization). There are additional considerations for how externally created content may be created and managed. Data scientists may see all information as a type of data, including structured data (i.e., transactional data), semi-structured data (i.e., web content) and unstructured data (i.e., text). Digital asset managers will see content as audio, images, and video – at various degrees of complexity and decomposition. In addition to these views, web content, document managers, records managers and archivists will have their own perspectives. And, there will be unique information assets essential to the business that need to be considered – project documents, operational documents, transactional data, human resource records, report templates, financial data, digital signatures, and so on.

The important point is that if an organization is to design and operationalize an information management strategy it should acknowledge all of these types of information, specify which are included and which excluded from coverage in the strategy, and address the implications and consequences of that coverage in terms of organizational assets and liabilities.

Unique Reference Identifiers

The first principle of managing information assets is to be able to clearly identify and distinguish what an organization has. Identifying organizational information assets is facilitated if each asset has a clear and unique identifier. Unique identifiers for print assets may be marked on the object, or they may be assigned through metadata which is associated with the object. There are many options for uniquely identifying digital assets, including but not limited to internal unique keys assigned by repositories, Digital Object Identifiers, Persistent URLs, Publisher Item Identifier, the Serial Item and Contribution Identifier (SICI). At this point in time, there is no single agreed upon strategy for unique reference identifiers. The important point is that organizations should be aware of the practices in place for each type of information asset they possess, and to include a strategy for leveraging and integrating those practices at the organizational level.

Compound Information Objects

The compound information object acts as a container that holds together multiple objects, of any format, located in the repository. Compound information objects are made up of a parent object and multiple child objects. A project document can be a compound object if it includes a project plan, statements of work, and project reports. The individual objects are aggregated through the use of a common project identifier, though each individual document maintains a unique identifier. A monographic series, physical objects, audio-visual or collaborative projects are also examples of compound objects. Compound objects may also be managed using the Compound Object Content Model.

Chunked or Partitioned Information

Chunking refers to the strategy of breaking down information into smaller pieces. Chunking may be used to create information that is more easily consumable in a given context, for example as excerpts of internal documents for posting as web-accessible sites or for online learning. Regardless of context, the content that is chunked should be linked to the original source. An effective way to accomplish this is to create links from the original to the extracted source. To accomplish this it is important that easy piece of content have a persistent unique identifier.

Renditions and Redacted Information

A rendition is the result of the marking, translation or interpretation of an information asset to ensure that areas that should not be accessible are redacted and made inaccessible, invisible or unreadable to the reader.

Information Series

Series are objects that are released serially or in successive parts over a period of time once a year or less frequently. Series should be managed as compound object, ensuring that the individual objects are tied in some way to the parent or whole object. The most common form of a series is a monographic series which is comprised of individual books or reports. Series may be created for internal or external consumption. Internal series may be identified through a common title or through a formal series type or name. External series

are generally identified as a formal series with volume numbers and with a reasonably predictable publication rate. It is important to understand the challenges involved in identifying, tracking, accessing and preserving series objects that are not formally managed. Unmanaged series can be a significant source of liabilities for an organization.

Information Serials

Serial publications have a distinct title, contain a mix of individual articles contributed by more than one contribute and issues at regular and stated intervals of less than a year. Serials are intended to continue without end, without prior decision as to when the final issue will appear. Serials include journals and magazines, whether print or digital. Serials that are produced for internally for external consumption will be managed by a publishing operation or possibly by web content management processes. Serials are compound and complex objects. While publishing operations are the best source of issuance of serials, libraries are the best source of advice for tracking and managing serials issues. Libraries are also expert at syndicating and drawing attention to new articles of interest to consumers.

Redundant Information or Duplication

Redundancy of information refers to the proliferation of copies of information throughout an organization. Unintended redundancy is distinguished from intentional redundancy of applications and information for business continuity purposes. Redundancy in systems can be a positive thing – as it provides backup and continuity to support business. Unintended redundancy creates challenges for determining which is the record or official copy, for ensuring that the copy an individual is using is the authoritative one, and that resources such as storage and management are not inefficiently used to manage unnecessary copies. An information management strategy should acknowledge information redundancy and identify methods for counteracting or preventing it. Countermeasures may involve the preclusion of downloading or attachment of files to emails, preferring instead to reference links to the authoritative copy.

Close and Partial Copies

Copies of assets may be made for different reasons. Whenever copies are made and when the copying is supported, there should be a persistent way to identify the source and target. Copies may be exact duplicates, or they may be partial copies. Partial copies may result from versions of drafts, copies with annotations, extracts of original documents, or original information bundled into new information objects. Linking source and targets constitutes another type of complex objects. A proactive approach might involve the use of metadata or through references to the original from within the copy. A retrospective approach might involve using semantic similarity methods to identify exact, close or partial copies.

Information Versions and Editions

A version is a particular form of something differing in certain respects from an earlier form or other forms of the same type of thing. Editions pertain more to external or formal publications whose content may be revised and reissued over long periods of time. Versions pertain more to internal information assets, particular to working copies and drafts. Organizations should consider establishing conventions for designating versions so that the most recent version can be consistently identified, and all previous changes and edits can be traced. The simplest conventions for managing versions are those that focus on major and minor versions. Versions that are not managed can become liabilities when…..

Official Copies

This term refers to an official copy of an original record or a copy of said record that is not a duplicate, convenience or working copy. The record copy is the original or official document that is kept on file and is subject to the requirements of the retention schedule. The record copy must be listed on the disposition log upon destruction or transfer to the University Archive

Convenience Copies

All copies of a document that are not the record copy are considered convenience copies. Convenience copies do not need to be managed as formal business

assets unless they contain additional information which may have business value or evidence such as annotations, edits that reflect important thoughts or changes on a business related topic. Convenience copies are most often found in the working files of staff. Convenience copies can be working assets for staff, but as uncontrolled assets they also easily can become liabilities.

Encoding Schemes and Standards

Encoding is the representation of content in a structure or scheme to make it accessible and readable, generally by machines and applications. Encoding is generally a representation of a standard or set of expected-agreed upon fields for communicating or sharing information. The important point here is for organizations to understand that (1) they will need to translate their information into one or more schemes to share it with internal and external consumers; and (2) encoding schemes in and of themselves are not standard protocols. An encoding scheme should only be adopted to support information exchange. It is important to always critically assess the underlying standard or agreed upon structures before adopting a scheme. Encoding schemes are not intended to serve as internal information management structures.

Certified Information Systems

Information systems that have been evaluated in terms of their ability to support either information or records management. Certification may be based either on internal requirements or on external standards. Some systems are certified against external standards such as (DoD 5015.2) and others are certified for their internal functionality.

Network Drives

A network drive is a storage device on a local access network (LAN) within a business or home. Within a business, the network drive is usually located on a server or a network-attached storage (NAS) device. ... If the drive has enough capacity, it can also be used to back up all the computers on the network. Network drives are typically the first level of organizational storage for information because they support sharing and access across the organization. There are risks and benefits associated with using network drives for storage.

Workstation Storage Policies

Workstation applications and their filling structures are setup by individuals to capture and save information. Generally, these are working files. Workstation storage carries significant risks if they are not back-ended or backfilled to institutional repositories. Working files that represent the organization's business may be lost if there is a workstation failure. The most significant risk is that of access – others cannot access the information on a workstation unless the workstation dries are mirrored images of enterprise applications and drives.

Flash Drive Policies

While flash drive storage is convenient for transporting, sharing and storing information, they carry significant risks. Flash drives that are lost or stolen may constitute a security breach or an unintended disclosure. Some organizations have established policies that ban the use of flash drives connected via USB to any organizational network or application.

Transactional Systems of Record

A system of record (SOR) is an information storage system that is the authoritative source for a particular data element in a system containing multiple sources of the same element. To ensure data integrity, there must be one -- and only one -- system of record for a given piece of information. Systems of record are generally the preferred information management strategy for an organization's transactional data (i.e., human resources data, financial data, core operational data, etc.).

Property or Metadata Registration

A metadata registry is an application or a source where metadata definitions and values are stored and maintained in a controlled method. The registry may contain the definitions of all the fields in the metadata scheme and their permitted values. A metadata repository is the database where metadata is stored. Metadata repositories may also be a component of a document repository.

Embedded Properties

Document properties, also known as metadata, are details about a file that describe or identify it. They include details such as title, author name, subject, and keywords that identify the document's topic or contents. Standard properties typically include the object's title, author, keywords, and data. Additionally, some properties are automatically added to an asset including file size, file creation date, and other customized properties may be supported.

Manual Information Capture

Manual information capture defines the human action of storing the information – whether it is digital or print. Print information may be digitized and a digital copy filed, or physical information filing structures may be supported. Manual information capture refers to the action of filing or storing the information. Manual information capture assumes that individuals will take responsibility for storing information assets according to organizational guidelines. This approach carries high risks because individuals often assign a lower priority to storing and filing information than to other tasks. This may introduce risks to the security and availability of the information.

Automated or Default Information Capture

Automated information capture refers to a two-step automated process. The first step is the capture of the information itself – whether in born-digital format or in print-scanned format. The second step refers to a technology supported method for filing the information asset, without the direct intervention of a human. Automated filing may be accomplished through the establishment of default filing rules based on business unit, type of information and author, or it may involve more sophisticated semantic analysis and assignment of folders.

File Naming Practices

A file name is an important identifier for an information asset. File names refer to the name associated with the package or the information container. A file name is the chief identifier for a record. To ensure the value of assets is realized across the organization, it is important for everyone to find the files they need quickly and easily. How you organize and name your files will

have a big impact on your ability to find those files later and to understand what they contain. You should be consistent and descriptive in naming and organizing files so that it is obvious where to find specific data and what the files contain. Consistently named records foster collaboration. Consistently named records help you to meet your legal requirements because your records must be trustworthy, complete, accessible, legally admissible in court, and durable for as long as your approved records retention schedules require. Records that are consistently and logically named are easier to manage to meet these requirements. In the world of electronic records, the record's file name provides metadata that places the record in context with other records, records series, and records retention schedules. In most organizations, the policy for naming a file (and hence a record) is left to individuals or to groups of individuals (e.g., departments, committees). The file name may also reflect the title of the asset, but it may also be different. In unstructured text, the title may be placed in variant places and may be difficult to determine. Consider establishing an agency-wide file naming policy that complements your electronic records management strategy.

Folder Structures and Folder Naming Practices

Assets should be findable regardless of where they are stored in the organization. Most storage systems and repositories have a fundamental filing or folder structures. Folder structures and filing schemes are traditionally represented as hierarchical classification schemes. Classification schemes can be used to represent different types of classes, viewpoints and perspectives. To support access, use and sharing of information assets across the organization, assets it is important to have consistent directory structures and folder naming conventions across sources. Unmanaged folder and directory structures can be unpredictable and extremely costly in the time required to manage and to access assets. There are good practice guidelines for designing and naming folder structures. Folder structures should have the flexibility to integrate across the organization but to support the local unit's way of looking for and talking about their work. Folder structures should be flexible and adaptable, without being all encompassing and unwieldy. Common mistakes include extra-long folder names and complex hierarchical structures, structures that require extra browsing at the time of storage and complex paths for generating search indexes, folder names which are not clear and productive, folder names which do not use a consistent or logical ordering of elements,

and folder names which make use of acronyms or abbreviations which may lose familiarity or interpretation over time.

Information Titling Practices

Titles of information assets should be meaningful, and should clearly, concisely and as specifically as possible describe the content of the asset. The title should strive to be unique, so as to distinguish it from other assets.

Information Compression Methods

Many organizations have high volumes of information that must be stored. Text compression is a way of compressing segments of text by looking for patterns and substituting symbols for larger patterns of text. Text compression is commonly used in large transactional systems, in document and archival management systems.

OPERATIONAL ENVIRONMENT CONSIDERATIONS

The success of your information management strategy for each subsequent stage in the life cycle depends on getting this first stage right. Organizations that fail to think through the issues will create significant liabilities – chiefly in the form of direct and indirect costs – that will affect their ability to compete in their markets and sectors in the future. In the near term whether an organization creates information assets or liabilities also depends on how the issues are interpreted and translated to suit the operating environment. Failing to interpret these issues to suit your working environment could create performance issues, unexpected costs, and unintended consequences. Let's walk through the create and capture issues in different working environments.

Coordination Models

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized by shared clients, products and information. In developing a strategy for this internal working environment, it is important to consider the questions

in the following order: (1) where; (2) how; and (3) what. In this situation, how your strategy addresses content management will dictate what you can and cannot do to secure, organize and find it. In this model there are variant uses of information and different methods of assigning unique identifiers, versioning and copy management. There are likely unique information assets in different units and each unit may have different conventions and methods for managing information. Local repositories and databases will exist across the organizational landscape. This situation calls for a management strategy that synchronizes or at least maps practices at the enterprise level, perhaps with an unobtrusive enterprise solution. Any proposed management strategy must respect local processes and practices but also serve the enterprise business needs. Architecture design is critical to an effective strategy for this stage.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) how; (2) who; and (3) what. In this model, the standardization in place will be an important success factor for creating and capturing information. Organizations following this model likely have a good foundation for establishing and implementing policies related to copies, versions, editions and unique reference identifiers. The challenge, though, may lie in the performance and adaptability of a centralized architecture. Such architecture may have to operate in different local contexts – in terms of capacity and access conventions. An additional challenge pertains to ensuring that the conventions written into the strategy can be implemented at the local level and that they will not generate work arounds or one-off practices.

Diversification Models

Diversification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed, and business units maintain control of processes. There are few information standards in place and decisions are made independently. Infrastructure related

decisions are also independent and infrastructure design may be unique to a unit or location. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) who; (2) where; and (3) what. In this model, information standards are in place. However, business decisions and the authority to implement standards are with the local business units. This could mean that standards are interpreted differently at the local level. Additionally, technology infrastructure issues are made locally which means there will be a rich set of solutions at the local level. The information management strategy must identify and integrate these variant solutions. The organizational information management strategy should anchor on an enterprise level interactions and synthesis while linking to local points of control. An appropriate and suitable repository design will be essential to the overall success of information management. Additionally, a healthy and inclusive information culture will be critical to the success of any strategy for creating and capturing information assets

Replication Models

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) who; and (3) where. In this model, information assets are designed to meet local clients in the earliest stage. This means they will have to be mapped up to the enterprise level and an enterprise topology or inventory will need to be created and maintained. This is the most challenging of all the information environments for creation and capture because we begin with an unmanaged asset situation. This environment presents significant challenges for tracking records and for managing versions and copies. These same challenges exist for naming, filing, and redundancy management. An audit of the existing situation will be a critical first step here. It is also will be important to begin with an open and inclusive governance structure and crafting an open and inclusive information culture.

BUSINESS ENVIRONMENT CONSIDERATIONS

As we move from an industrial to a knowledge economy we expect a proliferation of ideas – not only from within organizations but from stakeholders and clients outside of the organization. The idea environment becomes much more fluid and complex as the external business environment advances. This generates a wealth of ideas but it also creates many more challenges. Ideas may be more directly communicated among people, and they may be communicated verbally using digital or multimedia technologies rather than the traditional text formats. Additionally, we expect to see non-human agents generating ideas and producing new or recombinant information. Over time these shifts in the first stage of the life cycle will have significant impacts in all subsequent stages, particularly in terms of where roles and responsibilities rest. The sources of ideas of value to organizations will proliferate and scatter across society. This complex and rich environment will present challenges for converting ideas into tangible physical or digital assets. Tangibility would include not only text representations but also recordings and video capture. Capture will be more challenging because the environments are now more fragmented and responsibilities for capture may rest with the creator. Engaging information professionals may be challenging in this new environment. This may suggest that anyone who is generating ideas also needs to have basic competencies pertaining to the creation and capture of tangible information assets.

A BUSINESS STORY: THE 5% SOLUTION

The Business Environment

This story comes from an organization that has both public and private sector divisions. Information management is 60% centralized and 40% decentralized. Policies are established centrally but interpreted locally. Priorities are set at the local level. Grant awarding organization. Highly confidential funding applications, reviews and decisions are the most sensitive information. The organization leverages both federal and private funds to support projects which means different levels of confidentiality and transparency. Information from applicants originates at the local level but decision information is managed centrally. Information management has been around a central network drive

because there was no budget, resources or directive to manage information more rigorously. New CIO came in and established a mandate to manage information consistently and comprehensively

The Business Critical Challenge

The challenge they face is they cannot effectively find or use information from across different communities. If two communities have made similar grant applications to address common issues, the organization may be missing out on collaboration opportunities or cross-learning. However, there are no funds are available to invest in any new technologies and no resources to support open source materials which may have been freely available

The Business Solution

CIO has to work with the resources they have so he engages an outside expert to help them bring some common conventions to the network drive. Network drive has only one access point – what is called the "left edge" – like a traditional subject heading in the old card catalog. You can only search by the first entry point. While it is possible to build multiple facets into a single folder name, there is no enterprise or directory search system that allows staff to search across all facets. They can only browse and navigate the folder names. . The managers decide to define the structure around project names and numbers. While this supports business needs from a tracking perspective, it does not allow information to be shared across projects. There is no option to provide full text searching or to provide a search over properties assigned to documents. This is an interim solution which serves the "control" perspective, it does not address the "access" and "sharing" needs of the organization. . The CIO requires all documents to be stored in the network drive. This means that all versions of the documents are stored in project folders. In a short time, the network drive becomes a landfill of information. While all information is available from headquarters, it is unclear whether information from the local offices is making its way to the network drive due to access issues.

The Result

Because of the challenges in finding information the drive is used to store information but not for discovery. It is clear in a short time that this is a

partial solution but does not meet the basic information asset management requirements of an organization which is accountable to both the public sector and to private donors for their decisions and awards. There is no control over versions and multiple versions are written in coming to an award decision. There is no information typology so distinguishing structured forms from text documents or formal decision letters is difficult. While some control has been achieved, the efficiency and effectiveness of staff time spent looking for or using information has not been improved.

A Strategic Approach

While this was a reasonable approach or first step it was not a sufficient one. A better approach might have been to identify a staff member to take responsibility for establish a preliminary information management practice. As a first step, the information managers might have developed a simple inventory of information assets, established conventions for naming documents, established a version naming convention (outside of a formal function in an IM system), and identified a core set of metadata to identify and distinguish assets. All of these steps would have provided a strong foundation for at least a directory search strategy, and the foundation for a future information management application. By establishing policies and practices for these basic elements, the information manager also has a foundation for some basic training materials.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Identify and describe the scope of information assets to be covered in your strategy
- Understand issues around formats, versions, copies and renditions
- Identify storage practices and options
- Understand manual and automated representation and capture methods
- Consider when content should be captured and stored
- Understand different content capture responsibilities
- Understand the implications for your working environments
- Develop a working checklist of issues to investigate and consider related to information creation and capture

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Chapter 9
Classifying and Securing Information

ABSTRACT

This chapter focuses on the classification and security stage in the information lifecycle. The chapter identifies the key questions to answer in formulating an information strategy. Concepts associated with these issues and the consequences of ignoring them are explained. The issues are also interpreted in different internal operating environments and in the context of future business environments.

CLASSIFYING AND SECURING INFORMATION IN THE LIFE CYCLE

Security and Classification is the practice of preventing unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction of information (Peltier, 2010; Peltier, 2016). The information or data may take any form, e.g. electronic or physical. Information security's primary focus is to balance potential harm and value. Every organization must determine the types of harm that may result from using or providing access to their organization. Harm must be determined while ensuring that value is realized. Security levels are defined and assigned through a multi-step risk management process that identifies assets, threat sources, vulnerabilities, potential impacts, and possible controls, followed by assessment of the effectiveness of the risk management plan. Security classes assigned to information assets are paired

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with user privileges to ensure that assets are available to those who need them, and protected from accidental disclosure or discovery by those who are not permissioned. User privileges are often associated with groups of users, depending on roles and positions within or external to the organization. In some cases, though, security may be associated with a storage system or location, or with individuals. Chapter 9 presents key decision points related to security and classification, including considerations for different business and working environments. Chapter 9 presents key decision points related to securing and classifying information, including considerations for different business and working environments.

KEY QUESTIONS

Chapter 9 provides a deep dive into the key questions and decision points in the secure and classify stage of the life cycle. We offer 24 more specific questions intended to guide your thinking about how to secure and classify information assets and to prevent liabilities. The questions also form the basis of an audit of information assets. An audit should ask and answer all of the questions listed in this chapter. From these answers you should be able to judge the strength or weakness of assets in this stage of their life cycles.

These questions are organized into five easy to remember categories to help you work through them as you work on your strategy. We do not offer answers to these questions because only you can determine which answers best suit your environment. There is no single right or wrong answer. Short explanations are provided for key concepts as background and context. These explanations also serve as a working reference source for both business and information professionals.

The What Questions

Your strategy should explain….

- The organization's essential definition of harm?
- The circumstances under which information may result in liabilities?
- The harm that may result from the mismanagement of information assets?

- The levels of harm that may result?
- The representation of levels of harm as security classes?
- The overall coverage of harm by the security classification scheme?
- the impact that security and classification may have on access and use of information assets

The When Questions

Your strategy should explain when ….

- Security classes are assigned to information assets – when the asset is created, when it is designated as official, or another event that would trigger its classification?

The Where Questions

Your strategy should explain where….

- Where security is applied – to the whole document? To parts of the document? To whole projects or folders? To entire applications or repositories?

The How Questions

Your strategy should explain how….

- Security class assigned to content – manually through human interpretation, by machines based on business rules, or by default due to location or task?
- Security associated with or affixed to content?
- Security marks might be affixed to information?
- Security classes are read and interpreted by applications and repositories?
- Security classification might be changed for individual information assets or for categories of assets?
- Declassification processes are triggered and how declassification decisions are made?
- Declassification conditions are publicized to clients and stakeholders?
- Security aligns and is associated with individuals and with user groups?

- Security classification influences what information assets are available and accessible?
- Metadata for secured information assets is treated – whether it is made available in full or in part?

The Who Questions

Your strategy should explain who….

- Is responsible for creating and maintaining the security classification scheme?
- Is responsible for interpreting and applying classification values?
- Conducting security reviews and audits?
- Conducting declassification reviews and making declassification decisions?

CONCEPTS AND CONSEQUENCES

The concepts referenced in the key questions are explained below. The explanations are intended to be concise and pertinent to the development of a strategy. They are not intended to be comprehensive or academic treatises on the topic.

- Harm
- Degrees or levels of harm
- Information Classification
- Classification of whole information objects
- Partial classification
- Classification of folders
- Classification of systems
- Classification of applications
- Information Security
- Security classes
- Security markings
- Security properties
- Classification processes Declassification
- Manual classification processes
- Automated classification processes

- User privileges

Harm

Harm is defined as injury that may include physical hurt, damage to reputation or dignity, loss of legal right or breach of contract. Harm may be inflicted willfully - intentionally causing harm - or negligently. Failing to understand harm can generate significant liabilities to the business in terms of leaked, disclosed or stolen information that are critical to the success of the business.

Degrees or Levels of Harm

Degrees and levels of harm can include harm to individuals, to the organization and to the network or market in which the organization operates. Overclassifying information assets will create a reputational risk. Under-classifying information assets may give rise to unintended disclosure of sensitive business information.

Information Classification

Two factors should be considered when determining the appropriate classification for an information asset, including: (1) the level of harm posed by unauthorized disclosure, and (2) the parties that must have access to the information. Levels of harm might include potential reputational, financial, and operational risks to the organization or its stakeholders. The degree of harm might include moderate, serious or severe damage to the organization or its stakeholders. Moderate harm might include adverse local press coverage and reputational damage. Serious harm might include the inappropriate disclosure of confidential or proprietary knowledge that is shared with an external party that results in a contractual breach. Severe harm may result from the disclosure of financial information which affects the organization's placement or reputation in a market. Information classification is a key part and the first step in protecting information. Regardless of whether it is in paper or electronic form, information must be classified in order to provide the appropriate safeguards required for the protection of that information.

Classification of Whole Information Objects

Applying security classification values to a whole information object to ensure appropriate access to the document.

Partial Classification of Information Objects

Applying security classification values to parts of a document where the classes are different than the class of the whole document.

Classification of Folders

Applying security classification to folders in an application or on a network drive to ensure that only those with the property security clearance may access any information in the folder. The documents in a folder may have higher level security clearance than the folder, assuming that security properties are embedded in the object itself Folder security is traditionally inherited by any documents added to the folder.

Classification of Systems

An entire system such as an ERP system or an HR system might have a default security classification assigned to any information managed in that system.

Classification of Applications

An application is defined functionally – a specific application may have security assigned to it and inherited by any content that is created or maintained in that application.

Information Security

Information security is simply defined as the practice of preventing unauthorized access, use, disclosure, disruption, modification, inspection, recording or destruction of information. Information security classes and assignments should be consistent, regardless of the format or type of the information to which it is assigned (e.g., electronic, physical). The primary intent of information security is balancing protection of the confidentiality, integrity and availability of information assets while maintaining a focus on

efficient policy implementation, without hampering organization productivity. This is largely achieved through a multi-step risk management process that identifies assets, threat sources, vulnerabilities, potential impacts, and possible controls, followed by assessment of the effectiveness of the risk management plan.

Security Classes

The two broadest categories of classification typically used by organizations are (1) public, and (2) restricted. Restricted is often broken down further to reflect access and levels of harm. Examples of restricted classes might include official Use Only, Confidential, Strictly Confidential, and For Eyes Only.

Security Markings

Security markets should clearly display the classification/security markets, including the classification level, the classification category, the date of classification, the name, position title, and organization of the authorized classifier, the reference in a guide to the conditions supporting classification, the duration of the classification, the office of origin of the information asset, and any special markets as required.

Security Properties

Security properties may take the form of embedded properties or of externally represented and managed metadata. Security should be associated with each information asset the organization has created.

Classification Processes

Information classification is the process of assigning value to information in order to organize it according to its risk to loss or harm from disclosure. The greatest challenge to securing information assets is in the interpretation and application of security classes – particularly by humans using subjective judgment. Successful and effective processes are grounded in strong guidance and consistent interpretation of security classes. Liabilities can result from both under and over classification of information assets.

Declassification

When classified information of material no longer requires the level of protection previously assigned to it, it may be downgraded or declassified in order to preserve the effectiveness and integrity of the classification system. There should be clear guidance on the review process followed to approve or deny declassification requests. Additionally, organizations may choose to programmatically declassify information assets based on their types, creation dates and owning business units. Ideally, declassification decisions are made based on a general declassification schedule. Declassification decisions should also apply to any copy of the source document. Additionally, information may be declassified for limited periods of time, to pre-specified individuals or in specific contexts.

Manual Classification Processes

Manual classification is performed by individuals who review the source asset and interpret the classification guidelines in order to select and apply the most appropriate classification level.

Automated Classification Processes

Automated classification may be assigned to individual information assets based on machine readable and understandable business rules. Classification may also be triggered by events such as filing, when an asset might inherit the security classification of the folder to which it was assigned.

User Privileges

Access to secure content is generally operationalized or denied based on the privileges associated with an individual's role and the role that is associated with their user profile.

OPERATIONING ENVIRONMENTS: YOUR DECISIONS IN CONTEXT

Harm is situation and time dependent. No other organization's definition of harm, their security solutions or their classifications will fit your needs exactly. Understanding the internal working environments is critical to success in this stage of the life cycle. Where information lives, who control it, who has access to it and how it moves and is used by stakeholders are critical management issues. Any intended or expected variations in practice must be factored into the strategy.

Coordination Models

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized by shared clients, products and information. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) where; (2) who; and when. In this model we can anticipate consistent definitions of harm and its consequences because we have shared clients, products and information assets across the organization. However, there is a risk that security classes will be interpreted differently in different contexts. It is important to establish consistent security classes at the enterprise level. A common baseline could allow local variations and interpretations to be defined and mapped to the enterprise classes.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) who; and (3) when. This model presents the easiest working environment in which to define and implement an enterprise security solution. This provides a base for estimating the level of harm that might result from mismanagement of information assets – at the local and the global level. In this context, the

organization might begin by defining classes at the broadest level and then interpreting them and assessing harm at the lowest level.

Diversification Models

Diversification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed, and business units maintain control of processes. There are few information standards in place and decisions are made independently. Infrastructure related decisions are also independent and infrastructure design may be unique to a unit or location. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) where; and (3) who. In this model, it is important to begin with a comprehensive and inclusive model of stakeholders and their interest to under the full nature of harm. The comprehensive model, though, may emerge from a bottom up analysis of harm and security solutions. Classification of individual assets is likely to happen at the lowest level and subject to local practices and decisions. The organization should provide good guidance on interpreting and applying security classes. The organization should also support routing audits of security class assignments.

Replication Mod

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) who; (2) how; and (3) where. This is a complex environment. Security may be confounded given local ownership and adaptation of products. The fact that there are shared clients means that there is a need for some consistency of treatment f harm and security across the full product line. Governance, monitoring and auditing of security classification will also be important. The monitoring should focus on both classification and declassification. Without strong enterprise level governance, declassification decisions are likely to be made locally.

BUSINESS ENVIRONMENT CONSIDERATIONS

As we move from an industrial to a knowledge economy the volume and sources of tangible information assets will increase. The future may be more complex than the present – from a security perspective. We expect security technologies to increase in sophistication and the security classification methods to increasingly embedded and unique to information assets. Embedded securities will likely travel with the assets. This may enable assets to move outside of traditional firewalls. No security technology is unbreakable. As the mobility of assets increases, so do their liabilities and vulnerabilities. These challenges may lead to increased chunking or redaction of content early in the life cycle to ensure that portions of assets with potential liabilities do not have the security characteristics to leave the environment.

A BUSINESS STORY: TAKING THE EASY WAY OUT

The Business Environment

This story comes to us from an organization that manages international construction practices. The internal business environment follows the unification model. The organization has clearly defined lines of business, well-articulated business goals and business capabilities. Clients are local and these business goals and capabilities are interpreted to align with the local environment. The organization conducts sensitive international negotiations for construction projects around the world. In some instances, these negotiations contain communications between government officials, organizational project managers, local community and government officials, and individuals representing construction companies. Projects are developed locally but must align with corporate priorities. The board of directors sets business priorities and formally approves all projects. Over the past decade, leadership has shifted from construction professionals who know the business to financial experts whose expertise is in financial services. Because the organization works in many regions where there are many different business practices in place, local representatives must deal with and be aware of corrupt practices. There are corporate policies and processes that support reporting corrupt practices, but they move at very slow paces. Corruption is important because it may result in projects not having their intended

impact or producing the expected ROI. Information security classification is governed by a single high level set of risks and classes. The scheme was developed 50 years ago and has not been updated over time. The scheme is implemented through a mapping of classes to document types. Security class automatically attaches when a document is created. The organization adopted an enterprise document management system which has been implemented across the organization – centrally and in all of its local offices around the world. The system covers all of the organization's business capabilities and all kinds of information with two exceptions – financial and personnel information. These types of information are maintained in process specific applications. Each of these applications leverages a different approach too security. The document management system applies security at the folder level. The financial system applies access privileges to the project team only, or to their immediate managers. Financial information is not accessible to the board of directors or senior managers. Personnel information is only accessible to personnel officers and to managers. Managers are only able to see information for their current reports.

The Business Critical Challenge

A situation arises where one of the senior directors of the organization appears to have engaged in a corrupt activity and to exert undue influence on the human resource personnel to promote an individual. While there is internal concern, the corrupt practices process does not appear to have the power to raise and resolve the issue. Harm and risk have always been treated as an external issue. Processes and guidelines for handling high level internal corruption have not been clearly defined. The issue is referred to the board of directors but they appear not to act. A developer who has access to sensitive human resource and board documents is able to access documents because security does not attach to documents but to processes. The individual can bypass processes and get to documents. The documents are removed and shared with external stakeholders. The organization is exposed and its reputation is damaged.

The Business Response

The organization took an all too familiar action by firing the individual and opting to prosecute her through the courts. Access to the HR system – an internally developed application – was reviewed and strengthened. No further

security was applied to documents in the application. Requirements for a new application were developed and procurement was launched.

The Result

Unfortunately, it took several years and the procurement was not successful. The situation remained problematic. The classification scheme remained as it had in the past – no new assessment of risks was undertaken. Knowledge of the organization's vulnerabilities was widely known and the organization was exposed to another external intrusion.

A Strategic Approach

A better strategy would have been for the organization to integrate security classification practices and risks into all of its governance processes. The fragmented approach left them vulnerable to risks they had not anticipated given the generally high level of integrity expected of staff and managers. Risks were expected from outside the organization or from inadvertent actions but not from deliberate actions on the part of individuals with high levels of access. Ideally, the CIO should have convened a working group to discuss and document security processes in place, to develop an understanding of risks in the 21st century – today and in the future. Additionally, the CIO charges the working group to run scenarios to understand potential threats. The threats are considered in relation to types of information, and to parts of information assets. Encryption, watermarking, redaction methods are reviewed and updated and applied across all types of information. Security classes and protections are then applied to every information asset – regardless of the asset in in which it resides. The protection then carries into the future – regardless of changes in applications, migrations or format transformations.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Describe the nature of harm to your organization and how it applies to your information assets
- Define or explain how security classification can mitigate harm
- Explain how to mark and assign security classes
- Explain the pros and cons of manual and automated classification methods
- Understand how to implement security in your working environment
- Prepare a checklist of working issues related to security classification to work from in developing your strategy

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Chapter 10
Organizing and Describing Information Structures

ABSTRACT

This chapter focuses on the organizing and describing stage of the information lifecycle. The chapter identifies the key questions to answer in formulating an information strategy. Concepts associated with these issues and the consequences of ignoring them are explained. The issues are also interpreted in different internal operating environments and in the context of future business environments.

ORGANIZING AND DESCRIBING IN THE INFORMATION LIFE CYCLE

Information description involves the identification and distinction of information assets. Identification is often grounded on the name or title of the asset, its creator or author, the date it was created, the type of information it represents and the owning or authorizing unit. Description may include the assets subject, its geographical focus, the business function or capability it pertains to, its record series and status, its security classification, or other descriptors that would be important for discovering, using or accessing the asset – descriptions that are important for organizing assets for discovery and use. Description may also include any administrative or preservation actions that are taken to preserve or dispose of the asset at the later stages of its life cycle. Identification and description also involve the creation and registration

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of metadata (Diamond, 2016). Metadata Management includes activities associated with defining the set of metadata attributes that are required to support the organization's information management and access activities, as well as the selection and implementation of a system encoding scheme to capture metadata. Metadata management also includes defining those reference sources and controlled values that are used to achieve data quality control over metadata values, including filing schemes, subject classification schemes, thesauri, country and region names, records classification schemes, business activity-process schemes, and so on (Gilchrist, 2003; Hedden, 2016; Joudrey & Taylor, 2017; Lambe, 201). It also includes operationalizing and maintaining the reference sources for use by the metadata encoding schemes. Metadata management includes the development and maintenance of metadata repositories and the import/export of metadata records to/from the repository. Metadata management also includes the creation of reference models and maps for harmonizing metadata across multiple information management or business process systems. This stage is rich with standards developed primarily by the library, archives and records management areas of practice. It is also a stage which is supported by a rich set of methods of creating and storing metadata. Chapter 10 presents key decision points related to describing and organizing information, including considerations for different business and working environments.

KEY QUESTIONS

Chapter 10 expands our high level description of the organize and describe stage with a deeper dive into key questions and decision points. Experience suggests that there are 40 key questions to ask as you develop a strategy to support the creation and capture of information. The questions also form the basis of an audit of information assets. An audit should ask and answer all of the questions listed in this chapter. From these answers you should be able to judge the strength or weakness of assets in this stage of their life cycles.

These questions are organized into five easy to remember categories to help you work through them as you work on your strategy. We do not offer answers to these questions because only you can determine which answers best suit your environment. There is no single right or wrong answer. Short explanations are provided for key concepts as background and context. These

explanations also serve as a working reference source for both business and information professionals.

The What Questions

Your strategy should explain…

- What discovery and access points are important to internal and external stakeholders – a question that is closely related to the issues raised in the finding, accessing and availability stages of the information life cycle.
- What discovery and access points are important to identifying and distinguishing individual information objects?
- What discovery and access points are important for subject, geographical, person, type, series or serial discovery and access to information objects?
- What discovery and access points are important for internal business units in making business decisions?
- What discovery and access points are important for internal information professionals for managing information assets throughout their life cycles?
- What strategy will you use to support discovery and access points? Will you use metadata? Will you rely on object properties? Will you rely on the internal specifications of applications?
- What metadata attributes is needed to support a metadata strategy?
- What core metadata attributes is required for all information objects?
- What additional metadata attributes might need to be added to support access and discovery to different kinds of information?
- What additional metadata attributes might be needed to describe the nature and relationships of complex information objects?
- What additional metadata attributes might need to be added to support access and discovery throughout the information object's life cycle?
- What metadata attributes is designated as master data?
- What metadata are needed to support information rights management?
- What metadata attributes is needed to support the user privileges?
- What metainformation is needed to encourage trust, use and sharing of information?
- Are abstracts needed to support review of and access to information?

- What external metadata standards or schemes do you need to map to support external discovery and access?
- What controlled reference sources are needed to support discovery and access for each metadata attribute?

The How Questions

Your strategy should explain how…

- Attributes *behave* and how they are *specified*, i.e., how would you expect values to be chosen when metadata is being created? How do stakeholders expect to describe it or to select values to use in looking for it?
- The controlled reference sources for each attribute is designed and structured, i.e., is it a simple pick list, a hierarchical categorization scheme, a semantic network or thesaurus, or other structure?
- Metadata values are chosen?
- Cataloging is performed?
- Indexing is performed?
- Abstracting is performed?
- Metadata values are associated with the information object, i.e. manually, defaulted based on context or automated with intelligent machine methods?
- Metadata are defined and aggregated for complex objects? For chunked or partitioned information objects?
- Metadata values are encoded for internal sharing among applications?
- Metadata values are encoded or modified for sharing with external stakeholders?
- Properties inherited from folders or applications are instantiated in objects when they are removed from that context?

The When Questions

Your strategy should explain when…

- Metadata values can be augmented or changed?

The Where Questions

Your strategy should explain where…

- Metadata is stored, i.e., in metadata registries, in filing systems, in folder structures, as embedded properties, in linked data structures?
- Data dictionaries exist that might support metadata or property creation, i.e., in applications, repositories, etc.
- Embedded metadata registries exist within applications or repositories?

The Who Questions

Your strategy should explain who…

- Defines core metadata attributes?
- Defines extensible metadata attributes?
- Choses metadata values?
- Can edit or change metadata values?
- Assigns metadata to information objects?
- Defines folder properties and values?
- Makes decisions about the retention of and access to metadata?

CONCEPTS AND CONSEQUENCES

The concepts referenced in the key questions are explained below. The explanations are intended to be concise and pertinent to the development of a strategy. They are not intended to be comprehensive or academic treatises on the topic.

- Access and Discovery Points
- Metadata
- Metainformation
- Identifying and Distinguishing
- Subject and Topical Access
- Business Function Access & Discovery
- Geographic Access
- Content Type Access
- Series and Serials Access

- Core Metadata
- Master Data
- Extensible Metadata
- Knowledge Structures
- Controlled Reference Sources
- Flat List Structures
- Hierarchical Structures - Categorization Schemes
- Semantic Network Structures - Thesauri
- Ontologies
- Metadata Records and Schemes
- Metadata Field Specifications
- Metadata Registries
- Metadata Encoding Schemes
- Data Dictionaries
- Embedded Metadata Registries
- Administrative Metadata
- Rights Management Metadata
- Manual or Automated Categorization
- Manual or Automated Indexing
- Manual or Automated Abstracting
- Folder Properties
- Property Inheritance

Access and Discovery Points

Access and discovery points are any attributes or fields that someone might use to look for or search for information. For example, author, title, publication date, subject, geographical focus, type of information are all ways a person might think about and look for information. A more extensive discussion of discovery and access is provided in Chapter 10.

Metadata

Metadata is defined as data or information that describes another object. There are many different and distinct types of metadata, including metadata that is used to identify and distinguish one object from another, descriptive metadata supports flexible and extensible discovery, administrative metadata

which is used to support access to and management of the object throughout its life cycle, preservation metadata which chronicles any and all actions to preserve or dispose of the object. Identifying and distinguishing metadata attributes might include title, author, publication date, information type, version, edition, format, and unique reference identifier. Descriptive metadata supports subject, geographical, business function searching, browsing and navigation. Administrative metadata provides information to help manage a resource, such as when and how it was created, file type and other technical information, and who can access it. Metadata is critical to any search or browsing architecture that goes beyond simple full text search. Additionally, metadata fields generally support sorting of search results. Metadata attributes should be determined based on an organization's access and discovery needs. Organizations that chose an external standard or scheme without a formal and thorough critical review will generate both direct and indirect liabilities over time, as the scheme is changed or workarounds are devised to adapt it. Additionally, the adoption of an inappropriate metadata scheme will generate significant liabilities for looking for, finding and accessing information. Too often organizations chose external scheme with the good intention of facilitating information exchange and sharing. A more effective strategy is to define the organization's needs first and to map those needs to external schemes.

Identifying and Distinguishing Metadata

Metadata which identifies and distinguishes one information object from another may include author/creator, title, publication date, format, length, edition and version.

Metadata That Supports Subject And Topical Access

Metadata which supports subject and topical access may include but is not limited to the following: general subject areas, topics, keywords. This is one of the most complex types of metadata to support due to the simple richness of subject and topical perspectives. A significant challenge in supporting subject access is the variant principles and designed used to create subject and topic structures. Most of the structures available take the form of a hierarchical or categorization schemes. However, not all hierarchies are grounded on comparable principles. An organization likely has many subject schemes in

operation. Experience suggests that choosing one of these as the primary source will not be an effective strategy. Rather, mapping and integrating schemes will better serve the whole community. An organization should never assume that a single external structure will meet their needs. The liabilities generated by poor decisions for subject access are significant. They will result in wasted time in assigning subject values, and in time wasted in looking for and not finding information objects. While these costs may be invisible or not directly accounted for on balance sheets, they have a significant productivity and reputational cost to the organization.

Metadata That Supports Business Function Access

Metadata that supports business function draws from controlled reference sources whose values represent the organization's business architecture. This can include hierarchical categorization schemes or business function keywords and thesauri. These are two different kinds of controlled reference source. Either or both may Support workflow across applications by providing a common definition of business processes and sub processes, interoperability by providing an interoperable view into different functional applications, categorization of information assets from a business process perspectives, labeling and design of metadata-grounded business-oriented filing structures, aggregation of content into a business oriented browsing structure, the promotion, publishing, syndication and searching of assets by business perspective.

Metadata That Supports Geographic Access

Geographic metadata supports searching for information that may be about or from a particular geographical region, nation, city, geographical features. The challenge organization's encounter with this type of metadata is determining and mapping different geographical values depending on perspective and on time. Geographical names and locations change and both current and previous values are important to supporting access.

Metadata That Supports Content Type Access

Information types may be characterized in several different ways. Resource types, mime types, etc. For the purpose of this book, we focus on the kinds of

information that are found in an information object. Information types might include (1) structured data and data products; (2) publications; (3) internal documents of all types; (4) information about people and communities; (5) communications including web information; and (6) information about services, i.e., yellow pages.

Metadata That Supports Series And Serials Access

This is a complex metadata structure typically comprised of a parent record for the whole series and child records for individual issues or volumes. Serials metadata must also represent enumeration and chronology - the rate at which individual issues are published and how they are numbered or labeled when published. Serials and series are typically best managed by libraries and in serials modules of integrated library systems. Most organizations do not effectively track serials and series. Most content, document or records management systems do not have serial or series tracking functionality.

Core Metadata

Core metadata are those fields which are required for all kinds of information objects. They are essential to supporting access, management, discovery and preservation of information. Core metadata is often a small number of metadata attributes drawn from all four types of metadata.

Master Data

Master data represents the business objects that contain the organizations most valuable and business critical information. It is data which requires a single version to ensure consistent treatment across the organization, a single authoritative source and clear and well defined governance structures. Master data is specific to an organization. For example, it may describe the name of currencies or countries, the unique identifiers assigned to people, the names of administrative units, or the names of key individuals, the names and identifying numbers assigned to customers, products, vendors, suppliers, and so on. Master data may either be stored in a central repository, sourced from one or more systems, or referenced centrally using an index. However, when it is used by several functional groups convenience copies of it may be distributed and redundantly stored in different applications across

an organization where the convenience copy is continuously updated and synchronized with the authoritative version.

Extensible Metadata

Extensible metadata are fields which may be added to a core metadata scheme to support access points that are peculiar to some kinds of information, or which support management throughout different stages of the information life cycle. For example, project information will require tracking project numbers, project team members, and project phases – information that is not needed for digital video assets. Digital video assets will require metadata that identifies the videographer, the size of the video file, the bitrate of the video-file, the resolution of the images in the video. Extensible metadata are an effective way to support discovery and access while still managing the flexibility and efficiency of metadata structures. Extensible metadata structures can be partitioned and more easily associated with the overall enterprise information architecture. Extensible metadata designs are more easily and effectively governed and supported with automated methods.

Knowledge Structures

Includes one or more of any structures or tools used to organize and structure information to make it accessible. Knowledge Organization Systems (KOS) is a generic term used in knowledge organization about authority files, classification schemes, thesauri, topic maps, ontologies, and other methods of managing pre-defined values.

Controlled Reference Sources

Metadata fields whose values must be derived from a controlled source. The controlled source may be an authority control list, a categorization scheme, a thesaurus, master data such as country names, currencies, or products.

Flat List Structures

Controlled vocabularies, picklists. There is no relationship between the values in the structure except that they are part of the same structure. The major

requirement is that it cannot be any more complex than a simple set or list. If the list begins to branch into new categories, it is no longer a flat list.

Hierarchical Structures: Categorization Schemes

A hierarchical taxonomy is represented as a tree data structure in a database application. The tree data structure consists of nodes and links. In a relational database management context, the relationships become associations. In a hierarchical taxonomy, a node can have only one parent. Your Organizational Structure, your Business Functions are hierarchies. These will be Master Data Sources.

Semantic Network Structures: Thesauri

A network taxonomy is a plex data structure. Each node can have more than one parent. Any item in a plex structure can be linked to any other item. In plex structures, links can be meaningful and different. Your organizational thesaurus is a network structure. This is not likely a master data source.

Ontologies

There are many definitions of ontologies, and as many different designs and implementations of these structures. Essentially, an ontology is a representation, formal naming, and definition of the categories, properties and relations between the concepts, data and entities that substantiate a particular context or domain, multiple or all domains. All of the knowledge structures described earlier may be characterized as an ontology, with the exception of a flat list in which there are no relations specified among entities. .

Metadata Records and Schemes

Metadata records or structures are the aggregation of all of the metadata attributes required to manage information assets. These structures or records take the form of a faceted taxonomy – where each node represents a distinct attribute and access point with its own specifications and controlled reference sources. The focus of the metadata record is the information asset it describes. There are many distinct metadata standards pertinent to information assets including MARC, COSATI, Access to Biological Collection Data, AgMes

for agricultural information, Astronomy Visualization Metadata, CERIF – Common European Research Information Format, CF (Climate and Forecast) Metadata, CIF Crystallographic Information Framework, CIM Common Information Model, CSMD-CCLRC, Darwin Core, Data Package, DataCite Metadata, DCAT – Data Catalog, Data Documentation Initiative, DIF, Dublin Core, Ecological Metadata Language, FGDC/CSDGM, FITS – Flexible Image Transport System, Genome Metadata, PREMIS, Protocol Data Element Definitions, RDF Data Cube Vocabulary, QuDEx – Qualitative Data Exchange Format, and SDAC – Standard for Documentation of Astronomical Catalogues, among others.

Metadata Field Specifications

Metadata attributes should be specified, in other words they should have attribute definitions, statement of purpose, obligation, recordkeeping status, repeatability, attribute length, variable type, entry value, entry state, syntax, index status, active/inactive status, index condition, default value, preferred capture method, authoritative or governing reference source, reference mappings, and any sub-attribute or related attribute structures. Metadata specifications are critical to appropriate use in applications, to ensuring consistent business rules, and to information governance.

Metadata Registries

A metadata registry is a database or repository that contains and makes metadata accessible to other applications. Most information management focused technologies have embedded metadata registries that are designed to support management of and access to the assets in those systems. Metadata registries may also be stand-alone databases designed to contain and make accessible metadata from across the organization. Metadata registries may contain pointers to or location information for assets, but they do not contain copies of the information assets.

Data Dictionaries

A data dictionary is a kind of embedded metadata registry. It provides basic information about the data elements of an application. A data dictionary goes beyond a typical metadata registry, though, in describing the structure

of the database, the meaning of data elements, their relationships, origin, usage and format. In a data management application, a data dictionary is typically represented by a set of tables that define the basic data architecture of the application. Data dictionary may provide access to metadata for data in enterprise applications. Metadata registries contain information about the assets they reference, and they are described through data dictionaries.

Embedded Metadata Registries

As noted above, metadata can be stored internally in the same application as the assets it references (embedded metadata) or in the asset it represents (object properties). In the former case, metadata may be tightly integrated into the design of the application and difficult to extract or use outside of the application. In the latter case, the metadata is not externally referenced without replication. In the latter case, the metadata always travels with the asset. Embedded metadata does reduce the risk of having inconsistent or corrupted metadata for assets.

Administrative Metadata

Administrative metadata may include any metadata that support the management of the information asset. This includes metadata that supports use management or compliance with records management requirements. Use management metadata may include but is not limited to who has authorized the creation of the asset, who owns the rights to the asset, the conditions under which access is permitted and to whom, its physical or virtual location, the history of its use and access, the date it is scheduled for disclosure review and its disclosure status. Metadata that supports compliant document or records management might include but is not limited the record identifier, the asset's disposal status, its disposal review data, its management history, the relevant series and retention/disposition instructions, its preservation history, its placement in a larger complex asset, and its relationship to other assets.

Rights Management Metadata

Rights management, including digital rights and information rights management, includes the methods and tools designed to protect information assets from unauthorized access. Rights management may be as simple as a

copyright notice in a publication or a digital watermark on a digital document. Rights may also be managed through privileges and permissions, ensuring that those who do not have the credentials or meet the pre-defined conditions cannot access the information. Rights management may also be supported by information or digital encryption technologies.

Metadata Encoding Schemes

Metadata encoding schemes are specifications for encoding and packaging metadata. Encoding schemes may align with external de jure or de facto standards such as METS or they may be internally specified structures that facilitate the exchange of metadata between applications.

Manual or Automated Cataloging

Cataloging is the process of creating a catalog or metadata record for an information asset. Cataloging is sometimes focused on creating identifying and distinguishing metadata – it defines the basic unique characteristics of an asset. Cataloging is sometimes descriptive – it tells us what the information in the asset is about from many different perspective including subject, geographic, business focus, type of information, and so on. Manual cataloging is done by people – people review the information asset, identify the metadata values whether from the asset itself or working with a controlled reference source. Automated cataloging is performed by systems in full or in part. When machines generate metadata they use many different technologies. There is not one technology that will generate all types of metadata reliably.

Manual or Automated Categorization

Categorization is the process of reviewing an information object and determining categories or classes in a predefined scheme that are the best fit for the object. Human categorizers begin the categorization process with a deep understanding of the categories in the structure. They analyze and understand the object to determine is strongest areas of focus. They then make a best call for matching the results of their review with the options in the scheme. Machine categorization should function in much the same way. The machine, though, needs to be able to understand the scope and coverage of each category in the scheme. This means exposing and detailing

the concepts and rules that define each class. Categorization is distinguished from indexing which focuses on the selection of concepts that describe the key issues addressed in the information object. Categorization resembles the placement of a book or a DVD with others on a shelf near other similar objects. Indexing resembles the index or the terms used to describe the book or the DVD in greater detail. Categorization supports searching within sets of objects, as well as the automatic generation of browse and navigation structures.

Manual or Automated Indexing

Indexing is the act of describing the concepts or key issues that are treated or discussed in an information object. Indexing supports keyword and concept searching. Index values may be selected from a controlled reference source. Index terms may also include keywords selected by or suggested by authors, custodians or other stakeholders. Index terms which are controlled may be managed in different attributes than uncontrolled keywords. The purpose of indexing is to generate values which will be added to indexes for searching. Index terms represent a more granular level of discovery and access than does categorization. Though subject terms are the most common form of index terms, any focus is appropriate. In most organizations business terms and keywords are essential to discovery, access and management of information assets. If there is a need to control business terms, a separate business knowledge organization system should be created. Business and subject index terms should not be managed in the same source because they will be indexed in different structures and will be used by different stakeholders.

Manual or Automated Abstracting

An *abstract* is a brief summary of an information asset. Abstracts can be simple narrative descriptions or they can be in-depth critical reviews of the asset. Abstracts serve as summaries that help a person decide whether they want to access and read the full object. Abstracts may be unstructured or structured. Structured abstracts are grounded on templates that must be filled in either by an author or an abstractor. Abstracts may be generated either by people or through the use of machine rules and methods. It should help your reader understand the paper and help people searching for this paper decide whether it suits their purposes prior to reading. There are three types of abstracts,

including descriptive abstracts, informative abstracts, and critical abstracts. A descriptive abstract is short, and describes the purpose of the work, the methods used, and the scope of work. It does not include results, conclusions and recommendations. Informative abstracts are short; they describe the purpose of the work, the methods used, and the scope of the work, the results, conclusions and recommendations. Critical abstracts are like reviews but are typically shorter. We also think of abstracts as structured or unstructured. Structured abstracts are designed around templates in which the author or abstractor must address specific points or speak to specific questions. There are training programs and good practice guidelines for developing abstracts.

Metadata Registries

A metadata registry is an information system for registering metadata. Within ISO/IEC International standard 11179, a metadata registry is a database of metadata that supports the functionality of registration. Registration enables the metadata to be used and consumed by other applications such as search indexes, browsing structures, document management systems, archives management systems, records management systems, reporting systems, quality control and audit activities, and so on. Metadata that is not accessible outside of an application should at least be published in a directory structure to allow other applications to be aware of it and to access or request access to use it. A metadata registry manages the semantics of data and renders both the metadata and the information assets they describe understandable. Metadata registries are fundamental to access, use, re-use, interchange and general management of information assets. The underlying model is designed to capture all the basic components of the semantics of data, independent of any application or subject matter area. Metadata registration also allows two or more administered items describing identical objects to be identified, and it will identify situations where similar or identical names are in use for administered items that are significantly different in one or more respects. The most relevant de jure standard for metadata registries is ISO/IEC International Standard 11179-3 - Information technology - Metadata registries (MDR) - Part 1: Framework, March 2004.

Folder Properties

Folder properties are metadata that are assigned to a folder with the intent that those metadata will be inherited by and assigned to any object that is stored in that folder. A common set of folder properties or metadata might include, folder title, URL name of the folder, security classification, access permissions, date folder created, folder owner, as well as any other attributes that define or limit what is filed within the folder. Other attributes might include project numbers, geographical focus, subject focus, type of information, and so on. It is important to understand the effect of assigning properties to complex or deep folder structures where each folder might inherit not only the most immediate properties but those that are assigned to folders at high levels in the filling structure.

Property Inheritance

Inheritance means that the properties or metadata that are defined for a folder are automatically assigned to any object or document that is assigned to that folder. The properties are associated as long as the object remains in the folder and are effective for folder level discovery and access. However, folder properties may not be automatically instantiated in the information asset when it leaves the folder. It is important to understand the implications for security and access when using this strategy.

OPERATIONAL CONSIDERATIONS: YOUR DECISIONS IN CONTEXT

How an organization approaches this stage determines how cost efficiently and cost effectively it can support all of the subsequent stages in the life cycle. In the 21st century, intelligent applications make extensive use of metadata, master data and controlled reference sources. Where there is insufficient or no management, organizations will be at a disadvantage to leverage these applications. All indications are that these trends will continue and accelerate rather than diminish in the future. What is noteworthy here is that there is an emerging metadata architecture design that will serve all four environments. What is different is the strategy that each organization might take to achieve that end game.

Coordination Models

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized by shared clients, products and information. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) who; (2) how; and (3) what. This organizational structure of this model is likely to generate a fragmented metadata situation. There is a need for managed metadata is significant, particularly where it is needed to support finding and discovery later in the life cycle. Extensible metadata models will be important but may be difficult to implement given the autonomy at local levels. Master data management will also be very important at that level. Governance is unlikely to be successful without a workable metadata solution. Before governance can be introduced, at least a minimum strawman structure should be in place at the architecture level. Because of the complexity of the environment, it may be difficult to leverage other than manual methods. All controlled reference sources to support metadata creation should be defined at the enterprise level however there may be many different local practices and variations in place. An enterprise machine based approach to generating metadata could be an effective strategy. The cost of mapping and synchronizing locally generated and controlled metadata may be prohibitively expensive and ineffective.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) where; and (3) how. This model has the potential for effective enterprise level organization and description strategies. There is a good baseline for defining and implementing extensible metadata models, and to use metadata for identifying official record and convenience copies. This model has the potential to move an organization to a knowledge economy more effectively than the others because it is well

positioned to syndicate and promote information assets to internal and external markets and consumers.

Diversification Models

Unification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed, and business units maintain control of processes. There are few information standards in place and decisions are made independently. Infrastructure related decisions are also independent and infrastructure design may be unique to a unit or location. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) where; and (3) who. In this model, the best strategy will be to define common core metadata as a baseline across the organization. Extensible metadata models may be developed around the core, and designed to meet the needs of local units. There is also a need to define a common set of master data, and master data values. Governance of master data will draw representatives from across the organization. Master data stores should be easily accessible for all business units and consuming applications. In addition, governance models will be important for each controlled reference source. Metadata management will also need to accommodate local editing and augmentation of metadata values. This model calls for more intensive management and oversight than do the other models. Management and oversight, though, should be integrative and synthesizing rather than prescriptive.

Replication models

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) who; (2) how; and (3) what. In this model, as in others, a core common metadata foundation is essential. Extensible metadata models can build off the core to support local

ownership. A common set of controlled reference sources is possible, though the governance process should allow for coverage of local concerns. This may mean inclusion of jargon or local language in sources. Centralized prescriptive approaches to controlled reference sources are not recommended. Master data stores are likely controlled centrally with easy access to consuming users and applications. In general, local interpretation of standard products will be critical. This environment is a good candidate for machine generation of metadata values, with some flexibility for human editing and augmentation.

BUSINESS ENVIRONMENT CONSIDERATIONS

As the business environment moves from an industrial to a knowledge economy expectations for personalized and customized information environments will increase exponentially. In the industrial economy it was sufficient – and actually considered a significant advance for organizing information - to provide a single standard or authorized categorization scheme. As we move towards a knowledge economy, though, people will expect to have their interests represented and supported by personalized profiles. Each of these profiles will be grounded in a distinct set of semantics. Increases in semantic technologies and the capacity of systems to leverage semantics will shift roles and responsibilities from information professionals to language, linguistic and communication professionals. This dramatic shift is also supported by increasingly intelligent categorization, indexing and abstracting technologies.

A BUSINESS STORY: A FAILURE TO LAUNCH

The Business Environment

This story comes to us from a small not for profit organization that works with communities and local governments on a variety of topics and in a variety of economic sectors. The internal business environment resembles a coordination model. The organization leverages relationships with community and government leaders to understand and support local needs. These leaders are in contact with middle managers in the local field offices and at headquarters. The communication and information exchanged at this level is very important to understanding funding needs and to identifying project

outcomes and impacts. Consensus and consultation processes are important to the organization's success. The organization has a very low budget and the priority for any funding is to allocate it to community activities. There are few funds available to support information management. The bulk of the information management support is supported by the library staffs, who are also charged to provide reference and research advice to local partners and communities.

The Business Critical Challenge

The library has been tasked with developing a new information management platform that can be shared with external communities to support knowledge flows across communities and between communities and the organization. The library is given dedicated staff but not allocated any funds. The idea is to work with open source software to develop a minimal cost solution. Because these are all open source management, it means that internal development or shared develop work is needed. In the end, the work arounds and the lack of support for business needs of the external community result in shutting down the full design and

The Business Response

Requirements are developed, in consultation with the local communities, open source applications are identified, acquired and implemented. An open source application is purchased for content management which serves as a general repository. This application also includes the metadata repository. A second application is acquired to support the organization's knowledge organization systems. A third application is acquired to support search. All of these applications must be integrated, and all must be connected to the existing archives management system and the external web content management and publishing system. The extremely constrained budget prevented full integration across individual systems. System level integration was not possible because of the lack of programming resources available to the project. Integration took the form of manually moving documents from application to application. In addition, the use of traditional library metadata scheme, subject and topical classification schemes and full text searching did not support the business perspective critical to supporting stakeholders and middle managers. Additionally, because the library staff was not accustomed

to understanding the underlying knowledge structures and business rules of the schemes and taxonomies, they were incorrectly implemented in search and the external web system.

The Result

The program was ended and the project team was reassigned to other units and responsibilities. The general impression across the organization was that the project had failed. It took several years before the business need could be raised again. In the meantime, individual communities created their own solutions which resulted in an increasingly fragmented information environment.

A Strategic Approach

Convene a community working group to identify possible goals and strategies. A broader team of information managers drawn from across business units were assigned to the project with the mandate to present a strategy to the community for support. This also includes the intent to develop a common set of business focused knowledge organization systems that would be jointly managed and made available to all supporting systems. The full proposal is taken to management. Because it has the full support of the community, the risks of failure are distributed and the value of success is shared across the community. Meanwhile the internal records management team becomes aware of the project and indicates the organization has a license for a state of the art content management system that can be adapted to support the project. The RM and the library teams are brought together to implement a new instance of the application. The community of practitioners now devotes all of their time and effort to designing KOS that will serve their business needs. The new knowledge organization systems are also available for the library staff to use in other ways. With the new KOS and the new application there is an embedded capability to automatically index documents ingested into the system. The project leverages the new KOS and the new capability to improve access to all of the new content.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Understand what we mean by describing and identifying
- Explain the role metadata plays in supporting description
- Understand what we mean by organizing
- Explain the role of cataloging, categorizing, indexing and abstracting in providing important access and discovery points
- Explain the nature and purpose of different kinds of knowledge organization systems
- Describe manual and machine methods of organizing information assets
- Explain how to adapt issues to your working environment
- Prepare a checklist of working issues related to security classification to work from in developing your strategy

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Chapter 11
Finding and Discovering Information

ABSTRACT

This chapter focuses on the finding and discovery stage in the information lifecycle. The chapter identifies the key questions to answer in formulating an information strategy. Concepts associated with these issues and the consequences of ignoring them are explained. The issues are also interpreted in different internal operating environments and in the context of future business environments.

FINDING AND DISCOVERING IN THE LIFE CYCLE

Finding and Discovery include two important categories of tasks, specifically those that include 'looking for' information in the larger business environment, and those activities that pertain to searching within systems (Bates, 1989; Croft, Metzler & Strohman, 2010; White, Marchionini & Muresan, 2008). How individuals look for information is dependent upon their experiences, their knowledge, their sources and also the type of information they're looking for. To support all the ways that people might look for information, an organization should ensure there are multiple points of access and discovery, including directories, navigation and browse structures, and easy access to individuals, reference services, and search support. Search system creation and maintenance includes the configuration of the search system architecture, definition of searchable fields and search index parameters, search system

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interface and search results display and presentation, search results sorting and manipulation options, and the configuration of query processing algorithms (e.g. exact and fuzzy pattern matching, Boolean operators, query expansion, etc.). Browse includes those capabilities that allow users to physically navigate through predefined collections of documents. Browse structures may be constructed for any classification schemes defined for a system, where the values have been associated with metadata records for documents. This function also includes the ability to generate search transaction logs and browse transaction logs. Search and Browse also includes maintaining the search indexes and classification schemes to ensure efficient performance of these tools for users. Chapter 11 presents key decision points related to finding and discovery of information assets, including considerations for different business and working environments.

KEY QUESTIONS

Chapter 11 provides a deep dive into the key questions and decision points in the finding and discovery stage of the life cycle. Experience suggests that there are 42 key questions to ask as you develop a strategy to support the creation and capture of information. The questions also form the basis of an audit of information assets. An audit should ask and answer all of the questions listed in this chapter. From these answers you should be able to judge the strength or weakness of assets in this stage of their life cycles.

These questions are organized into five easy to remember categories to help you work through them as you work on your strategy. We do not offer answers to these questions because only you can determine which answers best suit your environment. There is no single right or wrong answer. Short explanations are provided for key concepts as background and context. These explanations also serve as a working reference source for both business and information professionals.

The What Questions

Your strategy should explain….

- What information your internal stakeholders are trying to find?

- What they think of when they look for information?
- What they know when they look for information?
- What different sources do they go to find information?
- What they know about existing information assets?
- What results satisfy their information needs?
- Finding strategies they prefer – searching, browsing, a hybrid or combined approach?

The How Questions

Your strategy should explain how….

- To design and build browsing structures?
- Support navigation across and within information sources?
- To design and support a simple keyword search?
- To, and whether to, support a faceted or parametric search?
- Decide which access points to include in faceted search?
- Decide which access points should be used to sort search results?
- Display the search results, i.e., simply links, surrounding text, or metadata?
- And whether to augment queries to improve search results?
- And whether to support federated search architectures?
- And whether to use search to support current awareness services?
- And whether to use search to support recommender systems?
- And whether to enable personal search profiles and queries?
- And whether to enable search query and results downloads and extracts?
- Indexes will be designed and what values will be included?
- Indexes will be refreshed, rebalanced and re-indexed?
- Browse structures and parametric search might be coordinated or similarly designed?
- Search interfaces will access and leverage controlled reference sources to support search?
- Search performance will be monitored and evaluated?
- Your stakeholders measure the performance of search and discovery?
- Successful your stakeholders are at finding information they can or will use?
- The languages your stakeholders use to look for information, i.e. single languages, multilingual, etc.?

The Where Questions

Your strategy should explain….

- Where your stakeholders are searching for and finding information, i.e., at the enterprise level, the application level, the site level, their personal collections, or the collections of colleagues?
- Where search needs to be supported to enable finding, access and use?

The When Questions

Your strategy should explain when….

- Information assets will be added to searchable indexes and be eligible for discovery?
- Indexes will be refreshed, rebalanced and rebuilt?
- the values from controlled reference structures will be maintaining reference source structures within search systems

The Who Questions

Your strategy should explain who….

- Who is looking for your information assets?
- Who is responsible for selecting search products?
- Who is accountable for organizational liabilities that result from search decisions?
- Who is responsible for designing search architectures?
- Who is responsible for defining and collecting search performance metrics?
- Who is responsible for designing and building indexes?
- Who is responsible for and can design a search interface?
- Who can design site navigation structures?
- Who can download and use controlled reference sources to support search and navigation?

CONCEPTS AND CONSEQUENCES

The concepts referenced in the key questions are explained below. The explanations are intended to be concise and pertinent to the development of a strategy. They are not intended to be comprehensive or academic treatises on the topic.

- Looking For
- Finding
- Discovery
- Searching
- Browsing
- Simple Searching
- Enterprise Searching
- Application Specific Searching
- Site Searching
- Personal Collections
- Collections of Colleagues
- Concept Searching
- Controlled Field Searching
- Known Item Searching
- Keyword Searching
- Faceted Searching
- Catalog Searching
- Directory Searching
- Federated Searching
- Full Text Searching
- Searching for People
- Indexes and Index Design
- Index Refresh and Rebalance
- Index Rebuilt
- Query Processing
- Query Matching
- Results Sorting
- Results Displays
- Current Awareness Services
- Recommender Systems
- Search Products and Exports

- Subscription Services
- Syndication Services
- Personal Search Profiles

Looking For

There are many different ways to describe how people look for and find information. The information science community may refer to these methods as information seeking, information needs, information wants, searching, browsing. Information scientist tend to focus on what prompts an individual to look for information, including recollection of an item, a question, an interest in learning, a knowledge gap, a reference by someone, and so on. Understanding the prompts is important for understanding how a person might go about looking for information. For example, if they are recalling information they have seen before they're likely to do "known item searching". If they have an interest in learning something, they're likely to do subject or topical discovery. If they have a knowledge gap or a question, they might look for a person who can answer that question. The information science perspective is the most important for grounding your architecture. However, it is not the only one. Technologists refer to these methods as information retrieval and searching. Information architects may think of this in terms of browsing, navigation, simple or faceted search. Looking for information is a general way of describing all of these perspectives. Looking for is different from finding information. It represents the starting point in a process, rather than the end point whether successful or not.

Finding

Finding is often used synonymously with searching but in fact the two terms are different points in a larger process. Finding is the act of discovering, locating, detecting or uncovering something. It is the end stage of a process which begins with "looking for" something. Finding may also result from several different methods and tasks, including searching, searching for something known, browsing a collection to learn what is there or browsing to locate something, or searching single sources or in multiple places. Finding also relates to when an individual determines that their information needs have been met, or when they are unlikely to be met using certain strategies.

Finding is important for understanding and monitoring the performance of your search, and to establishing search metrics.

Discovery

Discovery is both a generic and a specific term. It may be considered a method for finding something. It may also a formal legal term which pertains to finding and making available legal evidence which is pertinent to a legal proceeding. This may be termed Discovery when it is performed manually or e-Discovery when it is performed through digital or automated methods.

Searching

Searching is a more formal term that aligns in information management with information retrieval. When information professionals refer to searching they are talking about a large discipline of theoretical and applied search. Information retrieval (IR) is the activity of obtaining information system resources relevant to an information need from a collection of information resources. It may be grounded on a search systems which can take many different forms, including full text indexes, partitioned or dedicated indexes, faceted or federated search, and so on.

Browsing

Browsing is the act of looking though a predefined collection of information to learn about the content or to find something. Browsing is grounded in a predefined structure and organization of a collection of information assets. Browsing may be deliberate based on a knowledge of the browse structure, or it may be discovery oriented.

Simple Searching

Simple search reference to searching which allows a searcher to simply enter search terms in a single search box. Simple search only describes the way that search terms are formulated and presented to the search system. It does not speak to the design of the underlying indexes, or to the query processing or query manipulation rules.

Enterprise Searching

Enterprise search describes the coverage of a search application and the content that is covered in its indexes. Enterprise search applications have the capacity to reference all of an organization's content; however they rarely do because of confidentiality and security issues. Enterprise search does not infer anything about the design or architecture of the underlying application or index structure. Enterprise search may be either federated or centralized; it may be simple or faceted.

Application Specific Searching

Application searching means searching within a single application that contains information, for example a human resources system or a document management system or a web content management system.

Site Searching

Site searching is searched that is limited to the content of a site. Site searching may be enabled by a crawl or index constructed directly from the site, or it may be a site specific parameter that is added to a query at the time of search.

Personal Collections

Individuals crate working collections of information assets to support their work. Personal collections are developed around an individual's interests. Personal collections are created because they align with how the individual thinks about and looks for information, and because they are in close and easy proximity to the individual. They are easy for the individual to manage, but they are typically not accessible to others in the organization. These collections may contain copies of resources – perhaps not the final versions – and they may contain unique resources. The challenge for the organization is that these collections are used to support work and are assets that are inputs into the organizations decisions, products and services.

Collections of Colleagues

Collections of colleagues may also be important sources of information assets. Research suggests that information assets which are difficult to find due to ineffectively or insufficiently developed search systems are often found by going through personal networks. When these resources are not final or are unique, they may generate liabilities or unintended consequences. Organizations should be aware of personal collections throughout the organizations.

Concept Searching

A concept search (or conceptual search) is an automated information retrieval method that is used to search electronically stored unstructured text for information that is conceptually similar to the information provided in a search query. In other words, the *ideas* expressed in the information retrieved in response to a concept search query are relevant to the ideas contained in the text of the query. Concept search may be operationalized in different ways. It may be operationalized with an embedded thesaurus and a query expansion capability which automatically searches synonyms or closely related terms. Concept search may simply use terms that were searched to retrieve similar documents – the system assumes in this case that the concepts must be similar. Concept search may also be operationalized by looking for concepts in documents that are in close proximity to the terms searched.

Controlled Field Searching

Controlled field searching describes search against a predefined set of values. For example a Country field search may support search by providing a list of country names for selection. When searched, the pre-defined terms may also include synonyms or equivalent terms. For example, a search for United States might also include the United States of America, America, and USA.

Known Item Searching

A “known item” search is a search for an item or article when you have some or all of the bibliographic citation. Kind of information search, in which the user know what documents are searched for (or where at least certain data about the documents are known, such as the title or the author).

Keyword Searching

Searching based on any terms the searcher chooses to enter into a simple or open search box.

Faceted or Parametric Search

Faceted search is a technique which involves augmenting traditional search techniques with a faceted navigation system, allowing users to narrow down search results by applying multiple filters based on faceted classification of the items.

Fielded or Parametric Search

Searching by attributes or controlled fields where those fields are back-ended by structured metadata. Fielded search also support sorting and filtering of results, which is not supported by simple search that is processed against a full-text index.

Catalog Searching

The same as fielded searching because it assumes you have a catalog description covering different attributes or specifications about objects. Catalog searches typically allow the searcher to specify the objects they're looking for by field and field value.

Directory Searching

Directory searching is searching or looking for information within a deliberately assembled and structured resource. A directory is typically designed to support a particular type of navigation, for example alphabetical lists of department names or countries or individuals. A directory may also be a deliberately assembled set of resources – such as a web directory of resources that may contain references to assets such as a listing of all of the publicly available information repositories or applications. Directory searching is typically 'human powered,' meaning that an individual must manually look through each source in the directory.

Federated Search

Federated search is a search system design in which a query entered by a searcher is forwarded to multiple applications and searched against the indexes of those individual applications. The results are generally aggregated for review by the searcher. In some cases, results are redundant or duplicative. Federated search systems perform only as well as the slowest index in the federated architecture. They may have slow response rates or the slowest response may be eliminated from the results.

Full Text Index

An index design in which every work in the content that is being indexed has an entry point in the index.

Searching for People

People search is grounded on specific fields and parameters. Each field represents a description or a characterization of an individual, such as their first or last name, their organizational unit, their phone number or office number, their areas of expertise and their vital information. People search may be support by different query matching rules, for example Soundex matching may be used to assess the goodness of fit of last names. People search is one of the most important search capabilities in an organization because it supports the internal professional and social networks.

Indexes and Index Design

Indexes are the most important component of any search and browse structure. There are many types of indexes and each type has a different structure. It is important to understand index design because they dictate the performance and behavior of search. Full text indexes have an entry for every word in the content that is being indexed. Parametric indexes are built to support the values of metadata attributes. They enable results sorting and filtering. Parametric indexes support fielded or faceted searching, and are optimized to support the behavior and nature of individual attributes. Parametric indexes are designed to better manage the precision or recall of search results. Union indexes are constructed from a combination of parametric indexes and may also include

full text results. Index designs also determine how easy or challenging it is to refresh, rebalance or rebuild indexes.

Index Refresh

Index refresh means adding new references and entries to an existing index structure without changing the pathways or the structure of the index. It is in essence an appending of an existing structure. Indexes are typically refreshed on a minute or hourly periodic rate.

Index Rebalance

Index rebalancing means monitoring the length of paths from the top or entry point of an index to the last leaf of the pathway. Those areas of the index that reference more popular or frequently used letters, combinations of letters or terms may tend to have longer paths as the index is refreshed and appended. Rebalancing means adjusting these specific pathways to ensure search performance is consistent across the index. Rebalances may occur over periods of weeks or months.

Index Rebuilt

Indexes rebuilds involve a total reconstruction of indexes. Historically, library catalog indexes were rebuilt annually and involved weeks or months to complete. Rebuilds access all of the content in the database and construct a new index from scratch. Rebuilds provide optimal index structures, however they quickly become out of date as new content and entries are appended. Most systems involve rolling rebuilds or rebalances.

Query Processing

Query processing describes how a query might be augmented or framed to ensure the most effective retrieval. In some cases query processing involves stemming or truncation of terms, and automated expansion using pattern matching in an index. This form of processing should be used cautiously because it can produce unexpected results and unintended consequences. Query processing may also involve the automatic detection of the language of the query, and the translation of search terms for query across all languages.

Query processing may include adding synonyms to the query to ensure that the idea or the concept is searched rather than just the words. Concept expansion may include true or close synonyms, acronyms or the full spelled out form of an acronym or abbreviation, or superseded and antecedent terms. Query processing may also include adding other language translations of the terms search to support multilingual searching. It may also include the addition of attribute designations when a business terms or a geographic term is detected in the query.

Query Matching

Query matching is the algorithm used to determine whether a query matches an index in the entry. Typically, a match is defined as a full match (100%), a partial match (99% to 1%) or a non-match (0%). In some search systems, the degree of match is defined and operationalized as the "relevance" of the result. Those that are exact matches are presented at the top of the results list. Results with progressively declining match rates are listed in declining or less visible order. Results with no matches are not presented in the results. An important factor for matching is the default operator that is used to coordinate or order search terms. These are often referred to as Boolean operators. For most simple or keyword search system designs, the default operator is set to "AND". For fielded or parametric search system designs where the values are controlled the matching operator is set to "OR". Query matching is generally set to defaults and defaults sometimes need to be redefined to support information finding.

Results Sorting

Fields that can be used to sort the set of matching items. If the search was against a full-text index, there are no fields available to support sorting the results. Only those fields which are logged in the index can be used to sort. In a full text index this is likely to be limited to date and source where the source is a link or URL.

Results Displays

What is defined as a result, how it is presented, does it link to the object, and is it a short display or a full display.

Current Awareness Services

Current awareness services are tools you can use to keep up to date with the latest professional literature in your field of interest. There are a few different types of current awareness services available and different information providers may refer to their current awareness tools using different names. Today most current awareness services are based on search profiles which are periodically processed against designated sources. The results are forwarded to clients. Typically, run periodically and intended to identify new information to match the criteria.

Recommender Systems

A recommender system or a recommendation system is a search based service that identifies information of potential interest to individuals or groups of individuals. Recommendations can be grounded on content similarities, on the search and selection preferences or similar individuals, or the profiles that individuals have created to represent their information seeking interest. These three methods are referred to as collaborative filtering, content-based filtering, and hybrid recommender systems.

Search Products and Exports

Search exports and extracts describe the ability of search systems to capture search results as a distinct product, and to export them as a managed list. This becomes a new information object.

Syndication Services

In general, syndication is the supply of material for reuse and integration with other material. Syndication is the supply of material for reuse and integration with other material, often through a paid service subscription. Organizations often contract with external vendors to subscribe to and syndicate information from commercial databases such as Factiva or LexisNexis. Syndication services may be tailored to provide custom information products for individuals or groups of individuals within the organization. It is important to understand that these services and this content should not be incorporated into enterprise indexes because this inclusion may presume ownership, may render the

indexes out of date when content from the source becomes unavailable, or may inadvertently make this privileged content available to external stakeholders. Syndication methods may also be developed to push content from internal sources to internal stakeholders. In this case, syndication will be dependent upon the development of interest and user profiles.

Personal Profiles

In the context of discovery and finding information assets a personal profile represents the interests of an individual. Personal profiles typically leverage keywords and concepts that represent their subject, geographic or business interests, their language preferences, and the sources of interest. Personal profiles may be a set of complex search strategies that are run periodically against sources. These profiles may also be treated as information assets in some situations. Personal profiles are increasingly supported by intelligent search applications.

OPERATING ENVIRONMENT CONSIDERATIONS

This stage of the information life cycle is heavily dependent upon all three of the previous stages. If we don't know where content is or if it hasn't been tangibly represented, we cannot search for it. If it has not been classified for harm or security purposes, we cannot risk making any content available for fear of unintended exposure. If it has not been organized or described, there is no foundation for providing other than a full text search. In contrast to these concerns, search and discovery is the most important stage for leveraging the value of assets. Each of the four models presents different challenges and requires a different strategy.

Coordination Models

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized by shared clients, products and information. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) where; (2) how; and (3) who. In this organizational

structure, search and browse are only feasible at the business unit unless there is some strategy to organize and describe assets at the enterprise level. Subject, geographic or asset type searching across the organization will need to be constructed across the organization using a distinct virtual architecture. This model requires synthesis and integration of metadata, availability and access at the enterprise level. As this may be a difficult goal to achieve in the short term, experience suggests it might be more effective to first construct an enterprise directory of sources that hold assets. Such an approach serves to raise awareness of the importance of a cross-organization search function. It also increases awareness of the variations in practice in managing information assets. What to include in the directory is a good first step – a step that would be necessary to building an enterprise search. Organizations taking this approach often begin with the key enterprise or business systems and enable search within those systems. This approach also allows you to assess and improve the search wherever it exists. In this model, full text search solutions are likely to be highly ineffective and to produce significant opportunity costs. Consider that searchers only look at the top 30 results. In this complex environment full text search is likely to produce either huge results sets or no results. Organizations fitting this structure should approach enterprise search cautiously, manage expectations, and routinely monitor search performance. This stage can be the source of some of the largest liabilities related to information asset management.

The guidance for this model is to focus first on meeting internal business search needs, to be cautious about purchasing search tools, know what search tools you already have and most important – understand what your internal staff are looking for, where and how. Search performance and metrics should be defined and used as benchmarks. Search performance and metrics should be assessed at the local or application level.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) where; and (3) how. This is a good environment in which to try to build enterprise search

or any other type or level of search that might be grounded on essential designs. Common indexes can be designed and constructed from controlled values in business applications or other information repositories. This is a good environment for embedding controlled reference sources in search tools because enterprise search tools likely exist or can be effectively constructed. The organization can define and tailor query processing and query matching to align with user search methods and strategies. This model is also a good candidate for cross- or multiple-language search architectures. In this model, site search and parameterized search may be efficiently and effectively designed from the enterprise foundation in place to organize and describe assets. This working environment is best for defining search metrics and for monitoring and improving search performance

Diversification Models

Diversification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed, and business units maintain control of processes. There are few information standards in place and decisions are made independently. Infrastructure related decisions are also independent and infrastructure design may be unique to a unit or location. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) when; (2) where; and (3) who. Full text searching and index construction will be challenging in this environment. Full indexes will likely be unwieldy to manage and ineffective, i.e., if search results do not include the desired or a productive result in the top thirty the user will disregard the results. In this environment there is a high probability that staffs have preferred sources or will go directly to colleagues to find information. The most effective strategy for supporting search and finding in this model might be first design search at the business function level. This approach would build awareness of the value of search to the business. Site search is also going to be important in this model but would likely be constructed directly from the contents of a site. In this model, it is unlikely that you'll have any power to enforce standards or good designs or practices across the environment unless you can demonstrate value. Progress will have to come through raising awareness. Search performance and metrics will be challenging to track at the organization level. And, search performance and metrics will need to be assessed at the local or application level.

Replication Models

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) where; and (3) how. In this model, it is possible to design and develop a federated search architecture. Federated search architectures have performance issues but they are an option for an enterprise search where there is some consistency in metadata management across the organization. In this environment, it will be important to have good governance structures in place for controlled reference sources. Controlled reference sources can be integrated into search to translate across business vocabularies. How controlled reference sources are managed, though, will be important. To support this model, sources would need to be flexible, integrative and synthesizing across the business. Prescriptive, centrally mandated reference sources will not be effective for searching in this model.

BUSINESS ENVIRONMENT CONSIDERATIONS

As we move from an industrial to a knowledge economy search will become increasing invisible and embedded into applications. The amount of time people spend searching will diminish. The amount of time they devote to consuming information will increase. Consumption will increase because less time is lost looking for information. Information will be pushed to consumers based on their personal profiles and smarter syndication technologies. Intelligent agents will be developed to find and present information pertinent to any work task or personal task. Organizations will need to invest more in these technologies to support internal work as well as to meet customers and stakeholders expectations. These smarter technologies will have implications for the organization's architecture and for the competencies of all staff.

A BUSINESS STORY: A SIMPLE LACK OF COMPETENCIES

The Business Environment

This story comes from a successful energy company that has traditionally had a wealth of resources to devote to technology. The organization's internal business environment resembles a replication model. While much of the work is centralized at headquarters, the variation in clients and external business environments means designing and delivering a range of business products and services. Culture is one of centralized management of finances but local business processes and decision making. The challenge is one of riches rather than constraints. Over time it has devoted considerable financial resources for information management. The resource riches has been a factor for almost forty years dating back to the first client server and web applications of the early 1990s. This is a company that engages in a broader community to learn what problems other companies have and how they tackle those problems. The company's financial wealth makes it possible to bring in consultants and to purchase and implement the most advanced products on the market. There is no consequence if the project of the day does not succeed. A new team is brought in and charged with solving the same old problem. The organization is highly vulnerable to the marketing of vendors, particularly of new or revamped search software.

The Business Critical Challenge

The company also has faced a persistent challenge of not being able to find or discover their own internal information. The internal search problem has been a persistent problem. New CIO arrives and takes as his primary goal solving the enterprise search problem. Over a period of six months, he consults with all of the business units across the organizations, assembles a full set of requirements, sketches out conceptual models, develops use cases to determine whether the requirements are likely to solve the existing challenges, and lays out how the search system architecture should work. He tasks a small team to complete this work, and appoints two highly qualified internal staff leading the effort. As part of their work, the two compare the requirements to the available products on the market to ensure that there will be a good response to an open procurement. The procurement proceeds and a selection is made

that supports 80% of the required functions and features – including faceted search, site search, index specifications, integration of browsing and query expansion, and multilingual search. The product architecture will allow custom development the other 20% of the requirements over time. The new product is purchased and brought in house to implement. Unfortunately, one of the two project leads is assigned to another high level project at risk, and the other lead leaves the organization. The new project lead is a web developer and has not worked with search system architectures. The other project lead is a data architect who has not had extensive experience with information or search architectures. This is a challenge that many organizations face – the lack of search leads who have either successful experiences or rigorous training and certification in search products.

The Business Response

The CIO hires external consultants from a well-known technology consulting firm. The consultant spends six weeks talking with the new project leads and studying the application that was procured. Because the new project leads were not involved in developing requirements or selecting the search product, and because they do not have experience with search systems, the consultant decides the best way forward is to take the low hanging fruit approach. The full capabilities of the product were not leveraged – the promises made to stakeholders were not realized and there was a significant loss in trust. The only capability that was leveraged was the crawler which was found to have less configurability than the previous crawler – this meant that security classification of information would not be acknowledged. This resulted in whole repositories being removed from the project to ensure there were no unintended disclosures. . External consultants were brought in to implement ontologies around traditional subject access. In the process, significant amounts of metadata were lost due to the project leads case for dynamic crawling of all repositories.

The Response

The project cost ran into the millions of dollars because of the complex nature of the information assets and their different source systems. The project was released externally and a significant degradation in access was exposed. . The project was ultimately closed and tagged as completed. A

previous team was brought in to reinstate the previous search appliance. The reputational impact to the division was significant. Given the amount of money that had been devoted to the project and not generated a return on investment as expected, there was a hold placed on any new search projects. . The organization reverted to personal networking to find information. The initial problems were not resolved.

A Better Strategy

Given the many different types of risks associated with a project like this, a better strategy might have been to identify a single business unit to serve as a pilot project. . The organization should have acquired a limited time license of the product to test over the course of a year. Given the complexity of the environment, the case could have been made that a successful test and implementation would have been a major marketing item for the vendor. . The ideal unit should have been one that represented the full range of search challenges, and was also a high value business capability. The organization should have retained the two project leads and ensured that there was a broader team assigned to the project. The two leads should have been tasked with the pilot project and with coaching the support team to ensure the investment would be sustainable. . The support team also should have reflected the competencies needed to implement the features of the system and to test the fulfillment of the requirements.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Describe what information people in your organization look for
- Explain how they look and what methods they use
- Explain how to design and build a search system
- Describe successful and failed searches
- Describe search and finding metrics suited to your organization
- Explain how to interpret technology vendor marketing about search products
- Explain how to adapt issues to your working environment
- Prepare a checklist of working issues related to security classification to work from in developing your strategy

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Chapter 12
Accessing and Using Information

ABSTRACT

This chapter focuses on the accessing and using information stage in the information lifecycle. The chapter identifies the key questions to answer in formulating an information strategy. Concepts associated with these issues and the consequences of ignoring them are explained. The issues are also interpreted in different internal operating environments and in the context of future business environments.

ACCESSING AND USING INFORMATION IN THE LIFE CYCLE

To derive value from information it must be used. The use of information is influenced by many human information behavior factors (Fisher, Erdeles & McKechnie, 2005; Pettigrew, Fidel & Bruce, 2001; Spinck & Cole, 2006). There are two fundamental conditions that prevent individuals from using information: the availability of information and the accessibility of information. Availability and accessibility refer to the ways in which the organization and its policies ensure or strive to ensure that stakeholders have the means to find, read, understand, trust, and otherwise use information assets. Availability ensures that the assets are known and findable. Accessibility pertains to the actual use, trust and understanding of the information assets. The first relies heavily on information asset capture, description, organization and

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discovery. The second is more dependent upon the information culture of the organization – its attitudes toward using, sharing and repurposing information assets – and on a full explanation and accounting of the nature and source of the information. Chapter 12 presents key decision points related to using and sharing of information assets, including considerations for different business and working environments.

KEY QUESTIONS

Chapter 12 provides a deep dive into the into key questions and decision points in the using and sharing stage of the life cycle. We offer 41 key questions to ask as you develop a strategy to support the creation and capture of information. The questions also form the basis of an audit of information assets. An audit should ask and answer all of the questions listed in this chapter. From these answers you should be able to judge the strength or weakness of assets in this stage of their life cycles.

These questions are organized into five easy to remember categories to help you work through them as you work on your strategy. We do not offer answers to these questions because only you can determine which answers best suit your environment. There is no single right or wrong answer. Short explanations are provided for key concepts as background and context. These explanations also serve as a working reference source for both business and information professionals.

The What Questions

Your strategy should explain…

- Which information is *internally available* and to whom?
- Which information is *externally available* and to whom?
- The use of *collection policies* to manage availability?
- Whether both digital and *print or physical assets* will be made available to external stakeholders?
- Whether the *supporting data* for publications and papers is made available to external stakeholders?
- Whether information about *people and communities* is made available to external stakeholders?

- Whether information about *services* is made available to external stakeholders?
- Whether information is *freely available externally or at a cost*?
- Whether *metadata only access* or metadata and assets are made available externally?
- What *metainformation* is needed to access and use the information?
- The *metainformation* that is needed to make information accessible and usable, i.e., data collection and transformation, versions, programs and algorithms used, codebooks, dictionary files, errata files, user guides, etc.?
- Whether the *metainformation* needed is available or needs to be created?
- Criteria will be used to *disclose information* assets automatically?
- *Support and help services* might be devoted to helping external stakeholders discover and use available information assets?
- Expectations for *use* of information within and across the organization?
- Expectations for *sharing* of information by producers?
- Expectations for *use* of others information by subject matter experts?
- Expectations for *citing and giving credit* to others whose work is used?
- Expectations for *acknowledging the work* of others formally and informally?
- Are *renditions and redacted* assets made available and under what conditions?

The How Questions

Your strategy should explain how…

- Digital assets will be made *available*, i.e. as linked files, through formal requests, through third parties, etc. ?
- *Persistent uniform identifiers* might be used to make resources available externally and internally?
- Information assets will be periodically and automatically *disclosed?*
- Formal or informal *peer review processes* are used to mitigate information liabilities?
- Information assets are *authenticated* prior to making them available including any explicit or implicit expression of source of origination and provenance?
- *Digital rights* are defined and associated with digital content?

- The provenance of information assets is managed through metadata?
- Information assets are *authorized* for public access?
- Externally acquired and *'not-owned' information* is prevented from being published for external consumption?
- Information *access privileges* are used to ensure assets are not inappropriately exposed?
- Ideas and contributions of individuals are *acknowledged and rewarded* informally and formally?
- Information assets are formatted and prepared *for formal publication* and external availability?
- New information assets are brought to the attention of others, i.e., *recommendations, current awareness, content syndication*, etc.?

The Where Questions

Your strategy should explain where…

- Where available information is *discoverable* by external stakeholders, i.e., external repositories?
- Whether a *separate repository* outside the firewall to make assets available?
- Whether *metainformation* to describe the methods and sources to support access and use is also made available?

The When Questions

Your strategy should explain when…

- Information that is eligible for disclosure is disclosed?
- How often do *subject matter experts consult* with or use the information of other experts rather than look for information?

The Who Questions

Your strategy should explain who …

- Uses their colleague's information?
- Uses their own information over others?
- Maintains personal collections?

CONCEPTS AND CONSEQUENCES

The concepts referenced in the key questions are explained below. The explanations are intended to be concise and pertinent to the development of a strategy. They are not intended to be comprehensive or academic treatises on the topic.

- Availability
- Accessibility
- Print Resource Availability
- Digital Resource Accessibility
- Metadata Only Access
- Metainformation
- Collection Policies
- Culture of Information Use
- Culture of Information Sharing
- Citation Policies and Practices
- Acknowledgement and Attribution
- Peer Review Processes
- Digital Resource Authentication
- Authenticated Information
- Authoritative Information
- Disclosure Policies and Practices
- Publishing Processes
- External Facing Repositories

Availability

Availability means the public is aware of the research products or can determine that research exists. In other words, available research products can be found and acquired by the public.

Accessibility

Accessibility means the data resource is understandable to and usable by its intended audience. It also means that its research products are understandable to and usable by as many people as wish to use it.

Metadata Only Access

Where security permits that we only know that an item exists or that the specific item exists. In such cases, metadata may reveal more information about an information asset than is prudent or permitted under the security classification. In such cases, metadata itself and even individual metadata attributes may have security classifications.

Print Resource Availability

Requesting print copies for purchase, requesting print copies for loan, converting print to digital for the first request, costs to consider including the support services needed to process request. If you hand this off to a third party internally – a library or a publishing office, there needs to be a way to hand off the request and that third party needs to have access to registries and repositories.

Digital Resource Availability and Authentication

Digital resources may be located through the use of a purl, a DOI, etc. but it is also important to make sure there is some marking on the digital object that speaks to its authenticity.

Digital Resource Accessibility

Digital versions of information assets may be available, but depending on the type of information availability may not translate to accessibility. In particular, any information asset that needs further explanation or interpretation to ensure trusted use should also be accompanied by its provenance and metainformation.

Metainformation

Accessibility_means the information is understandable to and usable by its intended audience. Certain types of information require *metainformation* to be accessible. For example, the metainformation for structured data might include the provenance of the information, its versions, programs or algorithms used to manipulate data, any technical documentation explaining how data are designated and labeled are available, including codebooks, dictionary

files, data collection instruments, data maps, errata files, frequency files, cross-tabulation files, user guides, manuals, appendices, reports, record layout files, or rectangular files. Metainformation is also important for other types of information assets, in particular those with complex structures.

Closed Stacks and Repositories

A design where an individual must request access to an item through a third party, even if they know that the information object exists. Closed repositories may be physical or virtual. Closed virtual repositories may be commercial databases where in order to obtain a copy you have to pay the intermediary for access.

Culture of Information Use

Culture where individuals are incentivized to seek out and use information produced by others to further their own work rather than to create or recreate information themselves. Incentives may include reward systems which value creation over use. Information use may also be dis-incentivized by the difficulty of finding or learning about existing information. Information use is heavily dependent upon acknowledgement and attribution and citation.

Culture of Information Sharing

Culture where individuals are incentivized to make their information available to others with the intent of reuse and extension. This culture has a high level of trust in both the information creators and in the quality of the information. Information sharing is heavily dependent upon acknowledgement and attribution and citation.

Citation Policies and Practices

Also pertaining to information culture. Citation speaks directly to the acknowledgement of the original creator or contributor. Citation policies and practices should be encouraged throughout the organization and information objects should have the design options to support citations. Additionally, search should leverage citations for enhancing relevancy wherever they are available.

Attribution and Attribution Policies and Practices

Attribution means identifying the source of the ideas and information in an object. In some organizations, personal attribution is discouraged in favor of institutional ownership and attribution. Attribution at the unit level should be characterized as the authorizing source rather than the creator. Attribution is an important factor in whether the information is and should be trusted. If the source is trusted, the information might also be trusted.

Peer Review Processes

Peer review is a process by which work, typically research, is evaluated by peers. The peer review process is integral to scholarly research but it is also used in some law firms to ensure that legal knowledge and advice is known and shared. Peer review may take on an informal character as internal critical reviews. Whether formal or informal, this is a process of subjecting methods and findings to the scrutiny of others who are experts in the same field. Peer review is important to ensuring and improving the quality of information. It is an important internal process for identifying and catching potential liabilities.

Digital Resource Authentication

The trustworthiness of online resources is and should be a matter of great concern to an organization. Electronic documents pose a special challenge to the verification of authenticity because they can be easily altered.

Digital Rights Management

Digital rights management technologies are used to control access to or restrict the use of proprietary and copyrighted works. These technologies are used to control the use, modification, and distribution of copyrighted works. The effectiveness of digital rights management technologies is open to discussion, but it is an important method for organizations to be aware of and to consider if they want to ensure that the legal rights for their information assets may be put at risk. Protecting an organization's intellectual property and intellectual capital represented in their information assets is important to managing and mitigating potential liabilities.

Digital Watermarks

A digital watermark is a kind of marker embedded in an information asset, often in audio, video or image data. Watermarks can be used to identify copyright ownership and may also be used to validate the authenticity or source of origin of information assets. Watermarking is the process of embedding or hiding digital information in a an asset. The properties of a digital watermark depend on its potential use and the nature of the harm that might be done to the source if it is misrepresented, copied or used in an unauthorized way. Watermarking can be important to ensure that information assets which are released or disclosed in an unauthorized way can be traced. This is known as source tracking. Organizations may choose to watermark content that has a high level potential to cause harm if it is made available in an unauthorized way.

Authenticated Information

Before making information assets available either internally or externally the content or substance should be authenticated or demonstrated to be accurate, genuine, true, trustworthy and credible. Organizations should have internal business processes to ensuring that any information used to make business decisions can be authenticated. Some organizations such as law firms have internal review and authentication processes. Most organizations, though, do not and should be conscious of the fact that a lack of review and authentication may generate both internal and external liabilities.

Authoritative Information

Information used to make business decision or which may reflect on the reputation or credibility of the organization should be authoritative. This means the information has been reviewed and is trustworthy, reliable, dependable, valid and verifiable.

Disclosure Policies and Practices

In the context of information management, information disclosure is the act of releasing information in a systematic and considered way to make it generally available to external stakeholders. Disclose means to reveal

or expose information that has previously been kept a secret. Information disclosure is based on the conditions defined in an information disclosure policy. Disclosure which is intentional thoughtful and systematic is intended to provide access and to inform. Information disclosure can also be a liability. It is a liability when an application fails to properly protect sensitive information from parties that are not supposed to have access to such information in normal circumstances. This form of information disclosure is different from information disclosure pertaining to investment decisions which involves the release of all information about a company's financial status.

Publishing Processes

Organizations may have formal publishing processes. A formal publish process involves the writing, editing, designing, review, formatting, and marketing of information assets the occupation, business, or activity of preparing and issuing books, journals, and other material for sale.

External Facing Repositories

Organizations making information assets available to external stakeholders may need to create external repositories or copies of assets outside of a security firewall. Making assets available by allowing stakeholders to enter or access sources within the firewall creates high security risk.

OPERATING ENVIRONMENT CONSIDERATIONS

Use and sharing is heavily influenced by the information culture – the organization's incentives, rewards, basic assumptions and beliefs about the value of producing and consuming information. The structure of internal working environments can influence this culture. Where there is already a unified or a replication mind-set information use and sharing may be facilitated. Where the structure is fragmented or where diversification is the norm, the information culture may encourage recreation or using what is easy to find and access. In these models it will be important to develop a more robust information culture at all levels of the organization. Essential to use and sharing is an effective finding and discovery foundation. If the culture

is predisposed to use and sharing, but no one can find information assets, the culture will deteriorate.

Coordination Models

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized by shared clients, products and information. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) when; and (3) where. User privileges and permissions may be fragmented and variant across the organization due to local control. The local management of assets may create a high risk environment for supporting both availability and access. This environment also has the potential for an adverse information use and sharing culture. Encouraging a culture of information asset use and sharing may be challenging because business goals and rewards may vary across the organization.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) how; and (3) where. In this model, a strong use and sharing culture should be in place as a result of the standardization processes. We expect that internal markets for information assets will be strong because assets will be produced and consumed. There should be a level of trust and familiarity. There is also a good basis for quality control. This is a good environment for understanding the factors that contribute to a positive and productive information culture.

Diversification Models

Diversification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed, and business units maintain control of processes. There are few information

standards in place and decisions are made independently. Infrastructure related decisions are also independent and infrastructure design may be unique to a unit or location. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) who; (3) how; (4) when; and (5) where. This is the most challenging of all models to establish a positive and productive information culture. For this reason, all five sets of questions are critical. This environment likely has fragmented user privileges, fragmented and differentiated products, little incentive to explain how information was created or derived, and a challenging environment for tracking provenance and authentication. The first step in encouraging use and sharing in this environment is to assess and build a positive information culture.

Replication Models

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) what; (2) who; and (3) where. This model provides a good foundation for use and sharing. There is a strong foundation for authentication and validation of information assets, for building trust and for tracking provenance. All of this must be supported by a strong information capture, security, organizing and discovery foundation. Where that foundation is not available, though, a positive information culture cannot thrive or sustain.

BUSINESS ENVIRONMENT CONSIDERATIONS

The shift from an industrial to a knowledge economy will have variant and possibly conflicting impacts on this stage of the life cycle. The growth of personalized applications and intelligent agents will allow individuals to define their information environments. This may result in access to an increased volume of information assets, but also a more limited and custom-defined scope

and perspective. Simultaneously, individuals will have more opportunities to collaborate across and within organizations. While individuals have narrowed the information they encounter, they may be incentivized to share more in collaborative environments. This seemingly conflicting situation may take the form of peer to peer rather than large-network or large-repository sharing. Investment in and growth of personal collections may increase due to shifts in life cycle stages 2, 4, 5. The new architecture may end up being a peer to peer network infrastructure. As this scenario unfolds, networks and network profiles become increasing valuable information assets.

A BUSINESS STORY: THE UNCRITICAL SOLUTION

The Business Environment

This story comes to us from an organization whose business is to develop and distribute critical information to key scientists and engineers supporting military and intelligence work. The organization develops state of the art security solutions, gathers intelligence and monitors threats to organization. The internal business environment resembles a replication model. The scientists and engineers focus on generating future scenarios and state of the art solutions. This is a complex adaptive and dynamic environment where the business experts are continuously talking to experts around the world and learning about new developments.

The Business Critical Challenge

There is a need to ensure that state of the art and cutting edge information is pushed to individuals to ensure they have it when they need it. A recent assessment suggests that experts are spending 30 minutes a day looking for information in a range of sources, including people and external networks, but are only successful about 5% of the time. This is a huge indirect cost to the organization – running into the millions of dollars. The cost needs to be addressed – the goal is to improve access to information in a more efficient way

The Business Response

The IM team takes a traditional approach – they develop a recommender engine based on personal profiles. They work with HR, with search logs, information request and knowledge of the projects to develop initial profiles for individuals. They then work with individuals to update their profiles – these are based on topical keywords. The profiles are signed off on and are launched against the traditional sources - commercial databases, external gray literature sources, and open source information

The Result

The sources of information they used to match the profiles did not contain cutting information but rather it reflected information that was on average two years old. The keywords were developed at too high a level because they were derived from traditional library subject headings. The experts in boxes were flooded with recommendations for information of no particular value. The experts evaluated the recommendations by quickly scanning the authors and the dates – and determined whether the information was likely to be relevant or credible. After two months the experts began automatically deleting the recommendations. The recommendation system – while effectively developed – was not targeted to relevant sources or designed to find business-related information

A Strategic Approach

A better strategy would have been to build the search profiles around business terminology. A better strategy would have been to target key individuals, organizations and researchers in the field. Rather than a "subject" or "topic" oriented recommendation it should have been both business and thought leader targeted. The sources surveyed for recommendations should have been custom identified to align with gray literature or communities or specific market events

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Describe the difference between availability and access
- Decide which information assets should be available and accessible
- Decide what descriptive information to make available to support availability
- Decide what metainformation to make available to support accessibility
- Determine which factors influence use of information in your organization
- Explain how to support and encourage use
- Identify factors that encourage sharing of information
- Explain the challenges of supporting access and availability in different working environments
- Prepare a checklist of working issues related to security classification to work from in developing your strategy

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Chapter 13
Preserving and Disposing of Information

ABSTRACT

This chapter focuses on the preservation and disclosure stage in the information lifecycle. The chapter identifies the key questions to answer in formulating an information strategy. Concepts associated with these issues and the consequences of ignoring them are explained. The issues are also interpreted in different internal operating environments and in the context of future business environments.

PRESERVING AND DISCLOSING IN THE LIFE CYCLE

Preserving and disposing of information begins with identification and administrative control of records (Bearman, 1989). Records are preserved to ensure the continuation of business activities and to ensure that legal evidence, regulatory and financial compliance is satisfied. Records must be authenticated when they are created ant that authentication must be maintained throughout their life cycle. Preservation may focus on digital preservation which may mean the transformation or migration of formats to ensure continued access and availability. Preservation may also focus on protecting physical materials by minimizing chemical and physical deterioration and damage to minimize the loss of information and to extend the life of cultural property. Preservation is distinguished from conservation which addresses treatment to repair damage. Records are those materials that warrant preservation due

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to their business value. Archives management also contributes significantly to this stage as it is concerned with the maintenance of archival collections and materials. Archival materials may be either digital or physical. Archives management focuses on the acquisition, care, arrangement, description and retrieval of records once they have been tagged for either preservation or disposition. Chapter 13 presents key decision points related to preserving and disposing of information assets, including considerations for different business and working environments.

Information asset destruction is a set of processes and methods that may be applied to both records that have outlived their value according to retention guidelines or convenience copies that have no record value. Processes for destruction of materials may include retaining metadata to show their earlier existence, physical destruction, erasure from digital sources or directories, or simply removing references to them in sources. Destruction of information assets may also involve consultation with the business owner. Destruction pertains to both record and convenience copies of information assets anywhere they may exist in the organization. Chapter 13 also covers the key decision points related to the destruction of information assets, including considerations for different business and working environments.

KEY QUESTIONS

Chapter 13 provides a deep dive into the into key questions and decision points in the preserve and dispose stage of the life cycle. We offer 39 key questions to ask as you develop a strategy to support the creation and capture of information. The questions also form the basis of an audit of information assets. An audit should ask and answer all of the questions listed in this chapter. From these answers you should be able to judge the strength or weakness of assets in this stage of their life cycles.

These questions are organized into five easy to remember categories to help you work through them as you work on your strategy. We do not offer answers to these questions because only you can determine which answers best suit your environment. There is no single right or wrong answer. Short explanations are provided for key concepts as background and context. These explanations also serve as a working reference source for both business and information professionals.

The What Questions

Your strategy should explain…

- What you define as a *record or official copy*?
- *Types of information* that should be *retained*?
- *Types of information* that should be *disposed*?
- *Types of information* that should be *preserved*?
- *Classes of records* in a way that is understandable by staff?
- *Schedules f*or *retaining* records?
- *Schedules* for *disposing of* records?
- The *legally acceptable format* (i.e., print, digital) acceptable for documents
- The preferred *locked down* format of digital records?
- External standards or legal requirements guide records management actions and decisions?
- *Records hold* policies that may be invoked as needed?
- *Metadata* attributes required for *recordkeeping*?
- *Metadata* attributes required for *preservation*?
- *Particular recordkeeping conventions* that may pertain to specific types of content (i.e., financial data, personnel data, legal documents, etc.)?
- The *status values* for records?
- Whether *destruction of convenience copies* is a recommendation or a requirement?

The How Questions

Your strategy should explain how…

- To conduct information and records *audits?*
- To maintain *audit trails*?
- Information is *preserved*?
- To support *access to preserved information*?
- *Metadata for disposed records* is maintained?
- *Metadata for retained or moved records* is updated?
- *Format migrations* for preservation purposes are documented?
- Official record copies are *designated or marked*, i.e., through metadata, using watermarks, by moving it to a certified system, etc.?

- *Print records* are preserved?
- *Digital content* disposed of?
- *Print content* disposed of?
- To scan for *convenience copies*?
- How you operationalize and conduct *records hold*?

The When Questions

Your strategy should explain when…

- Content should be *tagged as official*?
- Content is *preserved*?
- Content is *disposed*?
- Scans are launched to find *convenience copies*?
- *Convenience copies* are disposed of or destroyed?

The Where Questions

Your strategy should explain where…

- Where *digital information* is *archived*, i.e., in certified systems, moved to an archival system, etc.?
- Where *print information* is *archived*, i.e., in archival storage facilities, in environmentally defined spaces, etc. ?

The Who Questions

Your strategy should explain who…

- Takes *preservation action*?
- Takes *disposition action*?
- Takes the *destruction action*?

CONCEPTS AND CONSEQUENCES

The concepts referenced in the key questions are explained below. The explanations are intended to be concise and pertinent to the development of

a strategy. They are not intended to be comprehensive or academic treatises on the topic.

- Official and Record Copies
- Active, Semi-Active and Inactive Records
- Convenience Copies
- Records Classes
- Records Class Schemes
- Record Status Values
- Records Audits
- Audit Trails
- Preservation
- Format Migration
- Culture of Preservation
- Preservation Format
- Records Retention
- Retention Schedules
- Records Management Systems
- Metadata Retention Policies
- Climate Control Issues
- Disposition
- Disposition Schedules
- Disposition Metadata
- Archives
- Archival Storage
- Archival Access
- Archival Metadata
- Archives Management Systems
- Custodianship and Stewardship
- Legal Definition of Evidence
- Legal Discovery
- Records Hold

Official and Record Copies

The record copy is the original or official document that is kept on file and is subject to the requirements of the retention schedule. An organization must define the conditions for identifying record copies. Conditions may

include determining the owning or business unit, the final version, the date of issuance and format preferences. Any actions taken regarding an official record should be recorded in record logs or in records metadata. .

Convenience Copies

Convenience copies are additional copies of records that are created to support work, reference or research. Convenience copies may be destroyed at any time and are not subject to retention or disposition policies. Convenience copies are generally found in personal working spaces, in team working environments, or on shared network drives.

Records Classes and Classification

According to ISO 15489-1 records classification is the systematic identification and arrangement of business activities and official records into categories according to logically structured conventions, methods, and procedural rules represented in a classification system. The process of developing and applying records classes is based on the business activities that generate records. Grounding records classes on business functions and activities facilitates their capture, retrieval, maintenance and disposal.

Records Series Schemes

A records series is a group of identical or related records that are normally used and filed as a unit and with the same retention periods. (Bernal, 1981). Organizations should have an organization-wide compilation of record series to ensure consistent treatment of assets and liabilities. Series which are defined for individual business units without regard to the larger organization value have a high probability of generating liabilities and risks. Series describe the period of time assets in the series should remain active, when they become inactive and instructions for their long term preservation and their final disposition. (Benedon, 1969)

Record Values

There are three commonly accepted perspectives on the value of records, including legal value, fiscal value, and archival or evidentiary value. Records

with legal value are those that pertain to long or short term rights of the government or the private citizen, and which are enforceable by laws and regulations. Records with legal value may include but are not limited to patents, contracts, leases, titles, deeds, treaties, and so on. Most legal documents and records are never destroyed and are usually archival in value. Records with fiscal value are those which show how monies are obtained, allotted, controlled, and expended. Fiscal value varies in lengths of time, from short periods for such routine items such as expense accounts and invoices, to long-term superannuation accounts, trust funds, etc. Records with archival or evidentiary value are those that can be used to aid in the reconstruction of the organization's past activities, provides information for current and future planning, and to furnish data upon which new activities may be based. Evidentiary value also pertains to business value. Records may also have archival value because they are unique which suggests that the record contains information which is not available, or which cannot be obtained easily from any other known source (Bryan, 2002).

Records Retention Schedule

A records retention schedule identifies the length of time a records series must be retained in active and inactive storage before its final disposition to permanent storage, archival preservation, or destruction. A major legal objective and benefit of retention schedules is that it serves as evidence to indicate that the organization does, in fact, observe an official policy for the disposal of its business information, and that this policy is implemented systematically in the normal course of business.

Active, Semi-Active and Inactive Record Status

Record status describes the phases of records throughout their life cycle. Records may be active, semi-active or inactive. Active records are being actively used to do the organization's business. Active records are often stored in sources in working environments including local hard drives or network shares and repositories. Semi-active records are no longer needed on a regular basis, but they are retained depending on the retention and disposition guidelines. Inactive records are at the end of their life cycle and their business value to the organization. If the record has historical value, it will be retained and preserved. If it has exceeded its retention and disposition

timeline, it will be destroyed. It is important to align these general record status categories with formal retention and disposition schedules to ensure there is some formal management over today's business information. The simplest way to get retention right is to build it into the way people work and where they work.

Records Audits and Audit Trails

An audit is an independent review and examination of records and activities to test for compliance with established policies or standards, often with recommendations for changes in controls or procedures. Although principally associated with finances, audits may also review records policy compliance to ensure they are serving their intended purpose. The reason automated audit trails have been so problematic to create and maintain is that software to support requirements was lacking. In the late 1990s system vendors began to offer new versions of their software that did incorporate automatic audit trail functionality. Audit trails are heavy consumers of system resources. System capacity is a condition required to support audits and to maintain audit trails is necessary (Bryan, 2002).

Preservation

Preservation is the professional discipline of protecting materials by minimizing chemical and physical deterioration and damage to minimize the loss of information and to extend the life of records. Preservation keeps records from harm, injury, decay, or destruction using non-invasive methods. Preservation is different from conservation which focuses on treating materials to repair damage. This characterization of preservation pertains to physical assets rather than to assets in digital form.

Format Migration

Format migration is the process of copying data from one type of storage material to another to ensure continued access to the information as the data structure becomes obsolete. It is the process of converting a data from an obsolete structure to a new structure to counter software obsolescence. Format migration makes no change to the bit streams or file content of the files copied. Format migration may involve changes in the internal structure

of a data file as needed to keep pace with changing software versions. Format migration may involve a more radical change in structure, such as changes from one application to another, such as Word to WordPerfect. Making changes in a data structure places the original at risk, as the new structure may not accurately capture the form and function of the original.

Culture of Preservation

The goal of preservationists is to ensure the long term health and viability of important information assets. Preservationists logically focus on protecting assets. The culture of preservation exhibits a healthy caution and respect for assets. Preservationists must balance the potential harm to assets from use and access with ensuring the asset is protected. Information cultures should include preservation and ensure that it is balanced with a culture of access, sharing and use.

Preservation Format

Preservation formats are the official and final format used to lock down and preserve you information assets and archives. Your preservation policy should leverage a file format which best preserves the content but also supports continued access. When selecting a preservation format, organizations should consider whether the format is open source or proprietary, has documented standards, is lossless or lossy (e.g., compressed and discarded content). Preservation formats should also have normalized versions across the organization to protect against multiple format variations. Preservation formats should guard against obsolescence, particularly ensuring that there is backwards compatibility with older file formats or that viewers or format migration strategies are in place. An organization with multiple types of information assets will support multiple formats. Preservation formats should be appropriate to and aligned with kinds of information assets. For example, pdf may be appropriate for documents but not for audio files or complex multimedia files (Bryan, 2002).

Preservation Metadata

Information about an object used to protect the object from harm, injury, deterioration, or destruction. Preservation metadata may be used to store

technical information supporting preservation decisions and actions; document preservation actions taken, such as migration of emulation policies; record the effects of preservation strategies; ensure the authenticity of digital resources over time; [and] note information about collection management and the management of rights. Preservation metadata encompasses all information necessary to manage and preserve digital assets over time. Preservation metadata is information that will assist in preservation decision-making regarding the long-term value of a digital resource and the cost of maintaining access to it, and will help to both facilitate archiving strategies for digital images as well as support and document these strategies over time. Preservation metadata is commonly linked with digital preservation strategies such as migration and emulation, as well as more routine" system-level actions such as copying (Bryan, 2002).

Records Management

Records management is the systematic and administrative control of records throughout their life cycle to ensure efficiency and economy in their creation, use, handling, control, maintenance, and disposition. The general purpose of a system of records management is that of providing the creator with the records necessary to support the efficient continuation of business activities, guaranteeing the recorded evidence, whether for internal purposes or for regulatory compliance. It includes the production and acquisition of reliable records for legal and technical purposes; the organization of the creation of records in an orderly and coherent manner linked to the functions performed; the transmission and preservation of authentic records.

Records Management Systems

Records management systems are computer applications or set of programs designed to track and store records. These systems can be used to manage the creation and maintenance of records within classification schemes, apply retention and disposal schedules, and control access and use.

Metadata Retention Policies

Metadata retention describes the policies and practices for retaining or disposing of metadata when an information asset has been destroyed or moved

to archival storage. In some cases, metadata is also destroyed. In other cases, metadata are retained and administrative and compliance metadata are added to reflect the change in location and status.

Environmental Climate Control

The process of creating and maintaining storage or display conditions appropriate to protect materials from adverse effects of temperature, humidity, air quality, light, and biological infestation, as well as human risks associated with housekeeping procedures, security, and fire and water damage.

Disposition

Disposition refers to the final destruction or transfer of records as determined by their record series and classification. Disposition is undertaken as part of an appraisal process - screening records before transfer to the archives or specific instructions on how records are to be destroyed. Disposition may result in records being transferred to a distinct archival system, to an archival physical location or being removed from or locked down in place within an organizational system.

Disposition or Retention Schedule

Retentions and disposition schedules provide instructions for the disposition of records throughout their life cycle. These instructions are developed at the records series or class level. Retention schedules may also include instructions for the disposition of documents and other materials that are not official records.

Disposition Metadata

These metadata describe those actions that should be or have been taken to dispose an information asset. These metadata can include the date of disposition review, the disposition decision and the assets disposition status, as well as the details of the disposition decision.

Archival Records

Some records have been determined to have enduring historical relevance. These may be referred to as archival records. Archival records may be in any format, including text on paper or in electronic formats, photographs, motion pictures, videos, sound recordings.

Archival Management and Storage

Archives management is the area of management concerned with the maintenance and use of archives. It is concerned with acquisition, care, arrangement, description and retrieval of records once they have been transferred from an organisation to an archival repository. It also includes the maintenance and use of archives, their acquisition, care, arrangement, description and retrieval once they have been transferred from an active systems to an archival repository.

Archival Value

Archival value refers to permanent value, continuing value, enduring value, and indefinite value of information assets. The ongoing usefulness or significance of records, based on the administrative, legal, fiscal, evidential, or historical information they contain, justifying their continued preservation. Experience suggests that records with archival value comprise only three to five percent of an organization's records. This is a key point to understand as some managers may be advised that all information assets created by an organization are records and that all records have archival value.

Archival Descriptions

Archival description[1] is similar to the process of bibliographic description, and some standards for archival description are derived from bibliographic standards. A key difference is that, in the absence of a title page to serve as the chief source of information, archival description requires a significant amount of the content of the description to be supplied from the context of the materials being described, whereas the content of bibliographic description is transcribed directly from the material being described. Archival description is the process of analyzing, organizing, and recording details about the formal

elements of a record or collection of records, such as creator, title, dates, extent, and contents, to facilitate the work's identification, management, and understanding (Bearman, 1989).

Archives Management Systems

Archives management systems are applications that support the archives workflow and provide long-term preservation storage for archived information assets. Archives management systems may be designed to manage print or physical archives by tracking them in their long term storage location, and digital archives. Archives systems may contain functionality to support the full archives workflow, including appraisal, accessioning, description, arrangement, access and finding aids, collection management and long term preservation activities.

Custodianship and Stewardship

Custody is the Care and control, especially for security and preservation; guardianship. Custody does not necessarily imply legal title to the materials. Legal Custody is the ownership and the responsibility for creating policy governing access to materials, regardless of their physical location. Physical custody is Possession, care, and control, especially for security and preservation. Physical custody may be, but is not always, coupled with legal custody

Legal Definition of Evidence

Evidence is defined as a record, an object, testimony, or other material that is used to prove or disprove a fact. In order for a record to be accepted as credible evidence, it is necessary to demonstrate that the record is authentic and reliable, that it is not fraudulent, and that its content is sufficient and accurate.

Legal Discovery

Information Discovery is a term used in the legal and corporate industry which refers to the steps involved in distilling a corporation's data corpus down to the most pertinent evidence pertaining to a court-related matter or compliance directive. The major information discovery steps include: managing the entire

data collection in a manner to identify all pertinent evidence associated with the matter, targeting that information for collection (forensically or otherwise), processing and identification (culling) of relevant data, and processing for document hosting and legal document/information review.

Records Legal Hold

A Records Legal Hold is a communication directing the halt of scheduled destruction of any records that are potentially relevant to litigation, investigation, or audit. Records subject to a hold order are said to be frozen. Records are typically frozen if they are potentially relevant to impending or current litigation, regardless of whether a hold order or subpoena has been issued. To freeze records means to suspend the scheduled destruction of records because of special circumstances, such as litigation, investigation, audit, or merger. Records are typically frozen if they are potentially relevant to impending or current litigation, regardless of whether a subpoena or hold order has been issued

OPERATING ENVIRONMENT CONSIDERATIONS

The internal working environment is a significant factor in whether an organization can effectively and efficiently support this stage in the information life cycle. Disposition, retention, and preservation can be a significant cost factor where a strong information management foundation (Stages 2, 4, and 5) does not exist. In that situation, preservation will be human- and communication-intense. In a decentralized or diversified environment there may be an added layer of complexity due to the complex legal and regulatory environments. How effectively or efficiently an organization supports this stage will be determined by the decisions and investments it has made to earlier stages in the life cycle.

Coordination Mod

Coordination models are characterized by unique business operations and autonomous management of operations. Business units have control over process design. Decisions are consensus based. This model is characterized by shared clients, products and information. In developing a strategy for this

internal working environment, it is important to consider the questions in the following order: (1) where; (2) how; and (3) what. Disposition and retention decisions will have to be coordinated with business units because they have control over process design. Preservation in place may be a good strategy for this environment to ensure that any assets that are preserved can be easily accessed and used in the local units. Preservation in place means that the information professionals need a good understanding of the applications in place at the local level. To make sure there is an organizational level view of assets, though, federated or directory access will be important. If a centralized preservation strategy is chosen for this model it may result in loss of access for local business units or lower performance issues. Who does retention, disposition and destruction is a significant challenge in this model. Best case scenario may be to train local staff in these functions, and to ensure that there is a strong communication network from local staff to the preservation professionals at the enterprise level.

Unification Models

Unification models are characterized by globally integrated processes with centralized support. Clients are both local and global. There is overlap across business operations and business processes are standardized. Functions are centrally managed, and there are common information products and services. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) who and (2) what. In this environment, centralized preservation activities and centralized archives management solutions makes sense. If this foundation is in place, it is possible to do automated audits and automated alerts to business owners and custodians. This environment presents broad legal challenges because of the diversity and range of clients. There is a need to understand how those legal challenges influence disposition instructions and actions. This model also lends itself to training local staff in disposition and retention decisions and actions, with strong communication and support from preservation professionals.

Diversification Models

Diversification models are characterized by a diverse client base, independent processes and unique business units. Business units are autonomously managed, and business units maintain control of processes. There are few information

standards in place and decisions are made independently. Infrastructure related decisions are also independent and infrastructure design may be unique to a unit or location. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) where; (2) how; (3) what; and (4) who. This model presents a complex legal and regulatory environment. It may be challenging to operationalize retention and disposition guidelines here without strong support from a team of preservation professionals. This can be a high risk environment for unnecessary retention and unintended exposure and discovery. Automated audits and automated alerts to business owners and custodians will be important. However, this is a challenging environment for automating workflow given the scatter and diversification of applications. In this model, it is important for preservation professionals to consult with local business units to learn more about the local legal and regulatory environment so they can advise on how to implement disposition and retention decisions. As with other models, training local custodians and business owners will be the best strategy.

Replication Models

Replication models have few shared clients, though there is standardization of information products across the organization. While there is centralized control over process design and standards, information products and services are locally owned and may be adapted to suit local clients. Independent business transactions may be synchronized or integrated at the enterprise level. Infrastructure that supports information is centrally managed. In developing a strategy for this internal working environment, it is important to consider the questions in the following order: (1) where; (2) how; (3) what; and (4) who. This is also a complex legal and regulatory environment. It will be difficult to operationalize any retention and disposition guidelines in this model absent a significant interaction with preservation professionals. Communications from central to local units, and among units within geographic areas, will be essential. Where automated audits and alerts are possible, they should be put in place as a foundation and working tool for preservation professionals. As with the other models, the best strategy will be to build local expertise to support this stage in the life cycle.

BUSINESS ENVIRONMENT CONSIDERATIONS

As we move from an industrial to a knowledge economy our information environment becomes increasingly rich and complex. At every stage of the life cycle new challenges and opportunities emerge. Perhaps the most challenging of all life cycle stages in a knowledge economy is the last stage – the retention, disposition, preservation and destruction of assets. The industrial economy presents a much more controlled environment. Retention and preservation are easier to accomplish because we have greater control over the environment. In the knowledge economy, retention and preservation are more difficult to manage because we can easily derive new products or components from existing assets. Identifying the original record copy, locking it down and protecting it from change are more difficult because of information scatter. As access to information increases, as use and reuse increases, and as opportunities to recreate new assets from existing assets grow, disposition and destruction are also more challenging. If the landscape shifts and access changes, disposition, retention, preservation and destruction may become the responsibility of individuals rather than an enterprise team of information management practitioners.

A BUSINESS STORY: HIDDEN BUSINESS CRITICAL ASSETS

The Business Environment

This story comes to us from the manufacturing sector. This company designs and produces products that require the blending and integration of expertise from multiple scientific disciplines. Its internal business environment resembles a unification model. There are clear business capabilities and these capabilities have clearly identified product lines. There is no single academic department or school that trains students to do this kind of manufacturing. Industry has grown over the past 100 years. Scientists and engineers are hired in and learn the process and build knowledge over the course of their careers. . Over time they generate information which is shared throughout the organization and they build personal files that contain information that has valuable knowledge. Because of the age of the sector the organization is experiencing a large number of retirements within a single ten year period.

The organization has an archives function, but it has not been stress tested in the past. The function has not been a high priority in the past and has survived with minimal staffing. . The approach has been to ingest files from retiring individuals, describe them at the box level, and label them with the name of the individual, their organizational unit name and the dates that are covered by documents in the individual boxes. . There has been little interest to access any of these materials in the past. The reason files may have been requested historically is when there was a legal suit against the company that involved work related to the individual.

The Business Critical Challenge

A high level scientist announces he is retiring within the next month. He has worked for the company for 50 years, and has built up a critical and unique base of knowledge around a particular topic. Because of a generational issue, this scientist has largely maintained paper or print files rather than to convert them to digital resources or to create new information digitally. His papers include all of his lab notebooks, drawings, correspondence and network connections to other experts in the field (his physical and virtual rolodex). He follows procedures for boxing up all of the materials in his office and calls the archives staff to retrieve them. He labels boxes as instructed. He also offers the company his rolodex and models, but the archives have no capacity to maintain physical objects so they decline.

The Business Response

Because the expert announced his retirement with a short timeline, the organization did not have much lead time to assign another scientist to work with him to at a minimum understand the materials he is transferring. While there is a larger network of scientists and engineers he's worked with over time, 75% of them have also announced their retirements. The organization realizes it has a significant problem – not in archiving documents and tangible information, but in preserving the living knowledge of the scientist.

The Result

The scientist tasked to assume the retirees responsibilities was challenged to come up to the standards and expectations set. Because the retiring scientist's

files have been removed from the working environment and stored in an archival storage area without keyword or descriptive access, the successor does not have easy access. The expert's files are organized according to records schedules, are only accessible through request and retrieval of individual folders within boxes which are described only at a very high level. It is easier for the successor to reconstruct the information he needs to continue the science and engineering. There was an impact to the organization – both indirect and direct costs – at a business level.

A Strategic Approach

A better strategy would have been to identify critical scientists and engineers during their careers, and to assign an information manager to work with them to convert their paper files over time. Additionally, the organization might have hired a knowledge mapping or a knowledge representation expert to work with the expert to document critical knowledge processes either as knowledge maps or as knowledge books. The most important step, though, was to make this information accessible through a living information management system rather than to store them only in a less accessible archival system. The critical consideration for any storage or software solution is to ensure it support the archival functionality and metadata to support legal or policy requirements. If an archival or records management application is used, it should support multifaceted description and organization, and cross file searching.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to…

- Understand what a record is
- Clarify what a record is to your organization
- Understand record series
- Describe retention and disposition schedules
- Explain how to assign record status
- Physical and digital preservation
- Preservation options in place or in a dedicated storage
- Interpret issues for your working environment
- Prepare a checklist of working issues related to retention, preservation and destruction to work from in developing your strategy

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Section 4
Staying the Course

Chapter 14
Information Cultures, Roles, and Responsibilities

ABSTRACT

This chapter defines organization culture and identifies the basic elements of any organizational culture. Information culture is a topic that does not generally receive much attention. In this chapter, information culture is described and supplemented with examples of information values, assumptions, and artifacts. The chapter also explains how to go about assessing the state of information culture, as well as ideas on how to strengthen information culture roles and responsibilities.

ORGANIZATIONAL CULTURES

At this point you should be ready to strategically manage your information assets. You have brainstormed a vision of your future business environment, developed long term strategies for ten, five and three years forward, have a good understanding of your current situation, a good governance strategy and a good understanding of key decisions. You need buy in for your vision and strategies across the organization. There is an old business adage, though, that reminds us of one more challenge –culture eats strategy for breakfast every time. While it may be difficult to identify the true source of the quotation, Schein (Organizational Culture and Leadership, 2005) reminds us that culture will always constrain strategy. Culture is difficult to change. While we cannot change the organizational culture, we may be able to shape and leverage its information culture to support our strategy.

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The information culture is a part of the overall organization culture. This is a focus point for learning and development. There is little reliable research on information cultures, and there is no guidance on how to manage those cultures that exist. It is important to understand this larger business culture. We need to understand how the organizational culture supports or constrains our information management strategy.

Experts in the field of cultural assessment tell us that every organization has multiple cultures (Choo, 2013; Choo Bergeron Detlor and Heaton, 2008; Oliver, 2008). Cultures exist and may vary by level – organization, unit, and individual. Experts tell us that unit level cultures are often the most influential and dominant in defining the organization's culture. They also tell us what factors shape culture and how to assess and characterize existing cultures. What experts do not tell us is what to do with what we know. This chapter considers how to use what we do know to craft an information culture that supports an information management strategy.

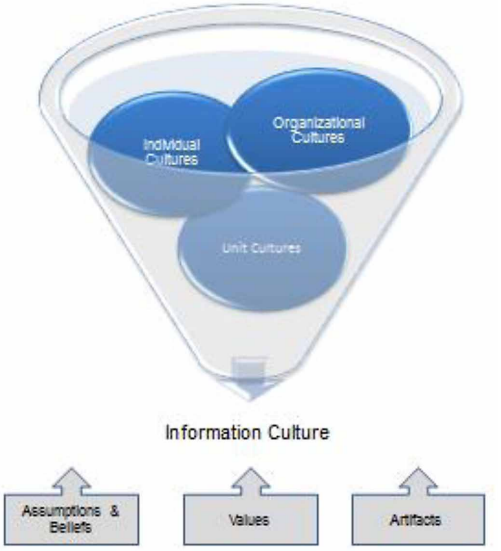
What Is Culture?

Organizational culture includes an organizations assumptions and beliefs, basic values, behaviors, and artifacts (Schein, 1984; Schein, 1990). Culture is manifested in rituals and routines, stories and myths, symbols, power structures, organizational structures, and control systems. Culture is viewed as a shared mental model which influences how individuals interpret behaviors and they behave, often without their being aware of the underlying assumptions. Schein tells us that an organization's culture is comprised of three things, including: (1) assumptions and beliefs; (2) values and norms; and (3) artifacts (Figure 1). Think of assumptions and beliefs as the fundamental things an organization believes in – it's essential guiding principles. Think of values and norms as act and behave in order to live up to those beliefs and principles. Think of artifacts as the things – whether implicit or explicit – that remind and reinforce those beliefs and behaviors.

Assumptions and Beliefs

Basic assumptions are at the core of culture and represent the belief systems that individuals have toward human behavior, relationships, reality, and truth. They describe how people perceive situations and make sense of events, activities, and human relationships. Assumptions and beliefs are formed over

Figure 1. Elements and levels of organizational culture



time as people develop strategies to cope with problems and pass along the strategies to new members. Beliefs lead to attitudes which in turn lead to intentions and to behaviors. Another element of assumptions and beliefs that are relevant to information is trust - trusting beliefs and trusting intentions. The process of progressing from beliefs to behaviors has been found to be highly amenable to the formation of trust.

Basic Values and Behaviors

Values tell us why people behave the way they do. Values in and of themselves are a reflection of underlying assumptions. Awareness of and support for values increases where those values are clear and evident. Values are the social norms that define the rules that govern how people behave and in our context how they interact with information. We see values in the way that individuals behave in their everyday work environments and their work practices.

Artifacts

Artifacts are tangible and visible objects that reinforce culture -- visibility of information culture through artifacts. At the third level, culture is manifested

through artifacts and creations which are the most visible manifestations of culture. These artifacts may include such things as art, technology, and visible and audible behavior patterns as well as myths, heroes, language, rituals, and ceremony. How do artifacts affect or define culture? Do your artifacts support a productive information culture? What may need to change? One clear artifact that influences our information cultures is the organization's use and treatment of technology. Information technology is not culturally neutral and may signify a set of values and underlying assumptions that may either support or undermine your information management strategy. Technologies may generate both liabilities and assets. Where liabilities are accepted without accountability or where they are ignored, there will be a significant impact on the information culture. Information technologies and how they are treated tells us a lot about the organization's values, underlying assumptions and meaning. .

While each of the three components can be defined and assessed separately, we expect there to be an inherent dependency among them. We may have explicit beliefs but perhaps those beliefs are contradicted by our artifacts. Implicit beliefs may be contracted by the behavior of leaders or key staff. Where these three elements are not aligned, the culture will be fractured. While every organization has at least one culture, that culture may not be productive. Culture in and of itself is neither positive nor negative. Our interest in culture is in how it aligns with and reinforces our information management strategy. In this case, all three components of the culture should align and reinforce the information management strategy. For this, we need to have a clearly defined information culture.

INFORMATION CULTURES

An effective information culture is the key to a lived and living information management strategy. What do we mean by an information culture? What do we know about information cultures? An information culture looks at information from a business culture but is grounded on good information practice. Information culture is reflected in the organization's values, norms, and practices with regard to the management and use of information. We define information culture as the set of assumptions, beliefs, values, norms, attitudes, behaviors, work practices, rituals, social dramas, and communication,

and artifacts that relate to the organization's information assets. Ideally, we should see some trace of an information culture in the organization's general cultural elements.

Every organization has one or more information cultures. These may not be well defined or officially sanctioned. However, these information cultures determine whether your strategy will be accepted and adopted or ignored. The primary reason information management strategies fail is that they fail to consider, align with or manage the existing information cultures. This is not a trivial challenge. Organizations typically have many information cultures, some of which may be contradictory. Let unaddressed, the information culture will deteriorate into information politics. Information politics can undermine not only your information management strategy but your business strategy as well.

Our premise in this text that the business side of the organization must play a lead role in the strategic management of information assets is reinforced by the earliest work on information culture. The earliest discussion and description of information culture comes from the business world and from three researchers in particular – Tom Davenport, Larry Prusak and .James McGee. How can we leverage and build upon their work? Tom Davenport (Davenport Eccles and Prusak, 1998) was among the earliest to introduce the idea of an information environment and ecology. Davenport called out information behaviors and culture as one of the six components of an organization's information ecology. He defines information behaviors to include information sharing and use (making information available), handling information overload (making information engaging so that the right people recognize and use the right information); and dealing with multiple meanings (creating a common understanding of concepts and terms used in an organization). Additionally, Davenport calls out information politics – information behaviors that derive from the power and governance methods designed by management. This definition of information culture focuses selective stages of the information life cycle, specifically Stage 2 Creation and Capture, Stage 4 Organization and Description, and Stage 6 Availability and Use. Today, we understand that information culture pertains to all stages of the life cycle, to all levels of the organization and to all roles.

Davenport later teamed up with Prusak (1997) to provide a combined business and information perspective on information culture. They define information culture as a pattern of behaviors and attitudes that describe the organization's orientation toward information. They provide examples of behaviors and attitudes including an organization's preference for facts

or rumors, the incentives to share or hoard information, preferences for exchange and delivery channels – face to face email, or social medial. They also highlight the existence of levels and variants of information culture across the organization.

Prusak continued this work in collaboration with James McGee (1993). These authors expanded upon the earlier work of with Davenport by calling out five models of information behaviors. We align these five models with the values and norms dimension of information culture. The five models include technocracy, utopianism, anarchy, feudalism, monarchy and federalism. Technocratic Utopianism is a heavily technical approach to information management which stresses categorization and modeling of an organization's full information assets, with heavy reliance on emerging technologies. Anarchy is the absence of any overall information management policy, which leaves individuals to obtain and manage their own information. Feudalism is the management of information by individual business units or functions, which define their own information needs and report only limited information to the overall corporation. Monarchy – definition of information categories and reporting structures by the leaders of a firm, who may or may not willingly share the information after collecting it. Finally, feudalism is an approach to information management which is based on consensus and negotiations of the key information elements and reporting structures for the organization.

There are also references to information culture in the information science literature specifically the work of Travica and Choo. While these are important sources, they reinforce the ideas of information use and sharing discussed by Davenport, Prusak and McGee.

Let's take their work as a foundation and construct a more comprehensive and inclusive view of information culture. This modern view should consider all stages in the information life cycle and all levels of the organization. Let's begin by reviewing the three components of culture – assumptions and beliefs, values and norms, artifacts – in the context of information.

Information Culture Assumptions and Beliefs

In Chapter 1 we discussed some common challenges to and opportunities for managing information. That discussion served as an argument for why we should manage information and why it is important to manage information strategically. The challenges and opportunities speak to the

essential assumptions and beliefs about information. Let's translate them to an information culture. In an information culture we might believe that:

- Information is an asset
- Information is a tangible asset
- Information is a capital asset
- Information liabilities should be minimized
- Information should be managed as a business asset
- Information should be used
- Information should be valued based on the sum of all its uses
- Information should be easy to find, access and use
- Value of information is determined by its full life span
- Information is manageable
- Information has a business context
- Information costs and liabilities should be managed
- Information management is a core business process
- Managing information is everyone's responsibility
- Information is managed according to best practices across its life cycle
- There is a single view of the information life cycle across areas of practice

The assumptions and beliefs in Table x may serve to guide you as you define your information culture assumptions and beliefs. These are core assumptions and you should expect to adapt or expand these to suit your organization. Keep in mind, though, that your values and behaviors and your artifacts should demonstrate or reinforce these assumptions and beliefs. The first sign of a fractured information culture is a misalignment across the three basic components.

Information Culture Values and Behaviors

Values are the deeply held beliefs about the role and contribution of information to the organization, as well as the principles that define how information ought to be created and used. Norms are derived from values, but have a more direct connection to behaviors. Norms are rules or socially accepted standards that define what information behaviors are normal or are expected in the organization. Norms may be explicit or implicit. There are two types of norms, including explicit vs. implicit, descriptive vs. injunctive. Explicit norms are typically codified as guidelines and policies that specify information

creation and use as part of organizational routines. Informal norms are not formally documented but are apparent in the day-to-day information activities of the group. Implicit norms are an important part of the socialization of the group. Descriptive norms are concerned with actual behavior, while injunctive norms refer to attitudes or what people believe to be right based on values.

Values and norms together mold the information *practices* of people and groups in an organization. Information practices are the observable, stable patterns of working and interrelating that link people, information, and technology in the social performance of organizational work. Insofar as information practices are enacted by a social structure of roles, rules, and warrants, they are a manifestation of cultural norms and values. What values and behaviors extend from our assumptions and beliefs about information? In an information culture, we might value:

- Information integrity
- Formal validated information over informal and unvalidated information
- Information is used to manage and monitor capabilities and processes
- Information is used in decision making
- Information is used to manage and assess performance
- Information is transparent – it describes errors and failures as well as successes
- Information is shared internally and information sharing is rewarded
- Information is used for sense making, enlightenment and learning
- Information is used to develop a better understanding of a problem
- Information is used to help individuals know what and how to do something
- Information is factual
- Information is conformational – it is used to verify other information
- Information is projective and predictive of future events
- Information is motivational and is used to initiate or sustain personal involvement
- Information is personal and political
- Information is proactive and is used to promote innovation in products and services

Information Culture Artifacts

There is little research or discussion of artifacts that pertain to the artifacts of information cultures. Most researchers focus on the value, norms and behaviors aspect of information culture. What are some possible artifacts that might follow from our assumptions, beliefs, values, norms and behaviors? Artifacts might include the information assets themselves, their visibility and presence and use in the environment, how we use technology to support information, stories and adages related to the value of information to the organization. Walk around your organization and observe how information is treated, promoted, displayed and used. A simple review of working environments and individual workspaces will tell you a lot about your organization's information culture. What would you infer about your information culture from the following implicit and explicit artifacts? Remember that artifacts can have both positive and negative connotations.

- A *unit manager's office* has no visible examples of information assets. Information is not viewed as an asset the manager uses to manage his business or to make decisions
- A staff office is filled with *boxes of print folders and lose files* tells us that there is little value assigned to organizing and describing information. It is highly likely that the condition of documents will deteriorate or be damaged. These records are not accessible to anyone other than the staff member.
- Search *system reports and visualizations* tell us search is heavily used and effective. These artifacts reinforce the importance of information and the investments that have been made in support of access and discovery.
- Meetings are held with *no agendas, no minutes and no formal record of decisions*. There is a subtle message that information is not an important input to the meeting, that discussions are not to be shared outside the meeting, and that a record of decisions to be made is not a valued behavior.
- Research data are stored on *personal laptops and network drives*. Research data is a personal asset or is not valued as an asset used in any future process, project or decision. Preservation of research data is unimportant.

- Managers make decisions and communicate these decisions in *conversations in the_hallway*. Use of the organization's information is less important than the manager's experience and gut feelings. Managers are not accountable for poor decisions.
- The lobby of an organization has an *LCD display which plays messages* from all of the key information managers. Knowledge of information managers is treated as a key information asset. Recordings communicate the importance of beliefs and values throughout the organization.
- Chief Architect has a set of *information and data architecture principles* on the wall in his office. Core values about information are on display for everyone to see. The Chief Architect refers to them throughout the day and reinforces them.
- Cafeteria has *table tents* that remind individuals of the information management support and training services. Value of information is reinforced through simply low cost artifacts displayed where individuals are socializing and relaxing.
- Organization's *library is an open area* adjacent to the cafeteria – with few walls. Library is seen as a social as well as a research and study area. Open walls make it easy for anyone to drop in and watch the information sources that are being streamed throughout the day.
- Organization's library is always filled with *individuals visibly working with information*. This implicit artifact reinforces an important behavior and norm – information use is a common behavior that is acceptable to management.
- There is a *visible virtual/physical shop* where the organization's information can be purchased by external stakeholders. There are two artifacts here – the physical or virtual store, and the digital or physical products. Fact that the organization packages its information for internal and external consumption is a significant cultural artifact.
- *Online self-study options* for learning how to fulfill individual information management responsibilities. This virtual artifact tells us that management values information management and makes this career option available to anyone who is interested. It also tells us that information is a professional practice rather than an informal off the cuff process.
- Every staff job description has *information culture and information management responsibilities*. This is a tangible artifact that reinforces

the belief that information assets are important to the organization, and the norm that managing these assets is everyone's responsibility.

- *Information management roles* are evaluated according to defined indicators and metrics. This intangible artifact reinforces the belief that information has value, and the norm that information behaviors have consequences.
- There are *visible award systems* for individuals who have high information management activities. This visible and tangible artifact reinforces the belief that information is a business asset, and that using information for business purposes is an important social norm.
- Senior and unit managers value the *awards for information management* they receive and post them on their office walls just as staff do. These implicit artifacts reinforce an important social norm – everyone is responsible for information management. It is a high level responsibility.
- The *organization's intranet has daily stories* about the importance of information – all stories have embedded links to the organization's information assets. This explicit artifact reinforces the importance of information production and consumption. It also highlights the use of official information in business decisions and processes.
- *Town halls* of vice-presidents are live streamed and preserved as information assets. The leader actively shares and uses information in these town halls. The leader understands that his/her *communications* are also official information and ensures that the full town hall exchange is captured and preserved as a multimedia object.
- *Information values statements* can be found on signage throughout the organization – in business and support units. This explicit artifact posted in the lobby reinforces the organizations basic assumptions and beliefs about information. Staff understands that good information management practices are important to the business.

These examples illustrate the fact that we rarely think of these things and actions as elements of an information culture. Rather, we may think of them as tools or products and individual behaviors. Every day these artifacts remind us of our information culture. This is why it is so important to ensure that culture supports strategy. When culture and strategy are not aligned, culture will eat strategy for breakfast every day.

LEVELS OF CULTURE: ORGANIZATIONAL, SUBUNIT, INDIVIDUAL

Every organization has more than one culture. Cultures exist and may vary by level of the organization. There are three levels of culture in any organization. The highest level is the organization. The next level is the unit or group level – the level at which we see the culture in action. This is the critical level for ensuring your information culture is understood, embraced, and built into reward and recognition systems. If the information culture that is understood and lived at this level does not support your information management strategy, your strategy will fail. Finally, culture is lived at the individual level. This level also is very important for your information culture because individuals collectively shape culture. It speaks to how individuals behave towards and treat information on a daily basis. To illustrate levels, we focus our examples on the norms and behaviors aspect of information culture.

Organization Level Information Cultures

The organizational level culture is the official culture – it is the culture that is officially sanctioned, presented to the external business environment, and promoted internally. Organizational culture is comprised of the culture of leaders and top level managers and an aggregation of all of the lower level cultures. This is an important point of leverage for developing an information culture. If your organization culture does not have a reference to information assets, this is the first gap to address. What can leaders do to build a strong information culture? What might leaders do to undermine an information culture? They might…

- Set an example for others through their own information behaviors – how they use, share, trust, and find information
- Reward or call out other leaders for their information related behaviors
- Ensure the message of information related beliefs and values are communicated often and to all levels of the organization
- Ensure that managers and human resources professionals take information culture seriously and ensure that beliefs and values are lived

Unit Level Information Cultures

The information culture of the unit is defined by the manager and the individuals working in a unit and by the daily practices of the organizational unit culture. At this level social norms have a direct effect on how individuals behave. It is at this level that your information management goals will be adopted or ignored. Unit managers will play a key role in achieving that leverage and must be viewed as key partners and players in realizing your information management strategy. We know that unit level managers' perceptions of and behaviors related to information are a defining factor in the real information culture of an organization. To develop an effective information culture you need to understand how unit level managers think about information. Unit level managers think of information in terms of information packaging, as information flow, as a source of new knowledge and insights, as a factor in shaping judgments and decisions, and as an asset they can use to influence others. Or they may see information as a transformative force that shapes judgments, influences others and is an integral aspect of the organization's business goals and strategies. What might unit managers do to build a strong information culture? What might managers do to undermine an information culture? They might…

- Incorporate information management and information culture audits into routine management methods
- Ensure that there are good information management practices in place in all of the unit's business processes
- Ensure that all members of the unit are aware of their information management and information culture roles and responsibilities
- Ensure that all members of the unit are trained in information management practices relevant to their roles and responsibilities
- Genuinely assess the information management performance of all staff and provide corrective actions as needed
- Practice and encourage information use and sharing through daily personal examples

Individual Level Cultures

This level of culture is critical to ensuring that your information strategy is embraced and is operationalized in how the organization works and behaves.

It is also the level at which you have significant leverage through rewards and recognition systems. Rewards and recognition systems are the primary tools managers use to identify and reward productive behaviors. This is also the most challenging level to understand and affect culture. Think back to those myths and common assumptions about information highlighted in Chapters 1 and 2. Those myths and beliefs are held by individuals. Leverage to change or influence the culture is most effective at this level. What individual behaviors will build a strong information culture? What might individuals do to undermine an information culture? Individuals will…

- Understand and support information culture assumptions and beliefs
- Manage their own information according to their unit and organizational norms
- See and call out information aspects of projects and processes to ensure information management values are honored
- Recognize the importance of information management as a personal performance factor
- Routinely use the organization's information and look for related information prior to creating or drawing from their personal information stores
- Always acknowledge the source of information and resist opportunities to appropriate information created by others

These are generic examples. You may not have an ideal information culture today, but you do have at least one or more information cultures. If you were to describe your information culture, what would it look like?

ASSESSING CURRENT STATE INFORMATION CULTURE

To strengthen your information culture and to align it with your information strategy, you need to know what you're working with. What do we need to do to assess our current information culture? You need to have a reasonably accurate description of your current culture. You can create this description using either formal or informal methods. Formal cultural assessment methods are available but they will need to be adapted. Existing cultural assessment tools focus on overall culture rather than information culture. There are a few cultural assessment tools that are well tested and rigorous. They can be found through a simple web search. You can determine their effectiveness

by looking at the scholarly literature. All of these tools assess culture for all three levels we described earlier and for all three components. All of these tools leverage a comprehensive set of questions which pertain to all three elements of culture. You can adapt the tools by refocusing the questions to incorporate your information assumptions, beliefs, values, norms, behaviors and artifacts.

You can also use informal methods to create a working description. If you prefer an informal assessment, begin with statements and descriptions of the three levels and use observation, interviews, focus groups, samples of information assets, and audits of information practices. You can learn a lot about how your culture is actually lived by simply walking around the organization and observing the information behaviors and artifacts.

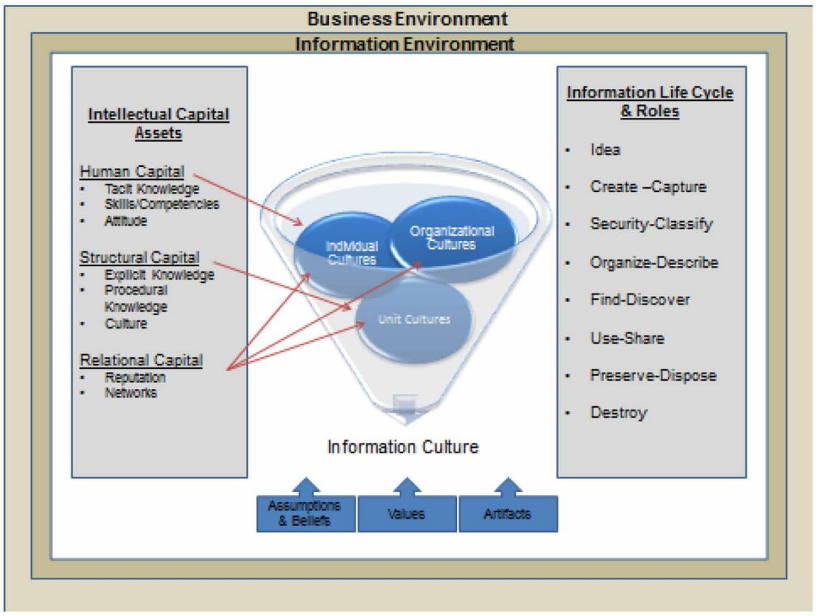
STRENGTHENING INFORMATION CULTURE ROLES AND RESPONSIBILITIES

Let's assume that you have identified the important information culture components, adapted them to an information culture survey instrument, administered the survey and discussed the results. What do you do with the results? Where do you go from here? The next step is to use what you've learned to build information culture roles and responsibilities. These roles and responsibilities should be assigned to the job descriptions and performance assessments of every individual in the organization.

Roles and responsibilities and performance assessments are a critical leverage point for shifting the information culture of any organization. While it will take time – perhaps even years – to shift the culture, this is a method that has proved successful. Initially, the inclusion of roles and responsibilities in job descriptions will simply raise awareness of the value the organization assigns to information assets. As managers reinforce good information practices and highlight poor information practices, behaviors will change. As public and visible rewards and recognition systems are developed, behaviors will shift significantly.

What do these roles and responsibilities look like? First let's be clear that we need to distinguish information culture roles and responsibilities from information management roles and responsibilities. Information culture and information related behaviors are closely tied to two intellectual capital assets – attitudes and behaviors, and organizational culture (Figure 2). Information

Figure 2. Relationship of information culture, intellectual capital and life cycle stages



management responsibilities are closely tied to the information life cycle and target the other six intellectual capital assets – tacit knowledge, skills and competencies, explicit knowledge, procedural knowledge, reputation and networks.

We assign information culture roles and responsibilities to individuals. An individual's performance should include their information attitudes and behaviors. Managers should be held accountable for the attitudes and behaviors, and for the information cultures of their units. And, senior managers should be held accountable for the attitudes and behaviors and culture of the whole organization. There should be consistency for individuals, across units and for the organization as a whole. This means we need a landscape of roles and responsibilities that can be added to individual job descriptions. There is a fundamental role and set of responsibilities that applies to everyone in the organization – this draws from basic information assumptions, beliefs, values and behaviors.

There should also be a role and a set of responsibilities defined for unit or group managers – those who are responsible for reinforcing and rewarding information behaviors. These draw from information values and behaviors. Unit and group managers should also have some role in developing information

culture artifacts that reinforce beliefs and behaviors at their unit level. Ultimately, corporate and organizational leaders have responsibilities for the organization's aggregate information culture, behaviors and artifacts. The beliefs and behavior of leaders can reinforce or undermine your information management strategy. The artifacts they produce or neglect to create will also reinforce or undermine your information management strategy. In order to develop these roles and responsibilities, though, you will need the support of leaders across the organization.

STRENGTHENING INFORMATION MANAGEMENT ROLES AND RESPONSIBILITIES

Information culture sets the tone for general information assumptions, beliefs, attitudes and behaviors. The information culture must be supported by information management competencies. Most organizations today make a fundamental mistake in assuming that only information professionals and practitioners should have information management responsibilities. We have made the case that business should own and drive the information management strategy, with good support from information professionals and practitioners. This means that everyone in the organization has some role and some responsibilities for managing information. What does this mean in terms of roles and responsibilities?

It is clear that information is an asset best managed across its life cycle. Chapters 8 through 13 remind us that each stage in the life cycle has a particular set of issues and decision points. Each life cycle stage requires a different set of competencies. Information management roles and responsibilities should align with life cycle competencies. Most organizations today make a fundamental mistake in assuming that there is a generic set of information management competencies that can be assigned regardless of life cycle stage. Information management job descriptions typically describe progressive levels of responsibilities for information management tasks. They fail to speak to the full range of life cycle competencies.

How can you address these fundamental challenges? Like shifting the information culture, achieving a comprehensive and include set of information management roles and responsibilities will take time. We recommend you begin with a high level view of responsibilities aligned with the life cycle. Consider using the RASCI method to define the broadest definition of roles

Table 1. Alignment of RASCI roles and life cycle stages

Life cycle Stage	Responsible	Accountable	Supportive	Consulted	Informed
Idea Generation	Business	Business	Information Managers	Information Managers	Information Managers
Create & Capture	Business	Business	Information Managers	Information Managers	Information Managers
Secure and Classify	Business	Business	Technology	Information Managers	Information Managers
Organize & Describe	Information Managers	Information Managers	Technology	Business	Business
Discover & Find	Information Managers	Information Managers	Technology	Business	Business
Use & Share	Business	Business	Information Managers	Technology	Technology
Preserving & Disposing	Information Managers	Business	Information Managers	Technology	Business
Destruction	Information Managers	Information Managers	Technology	Business	Business

and responsibilities. RASCI is a method for identifying who is responsible (R) for a process, who is accountable (A), who is supportive (S), who should be consulted (C), and who should be informed (I) (Table 1).

Those who are responsible own the problem or the decision. The person who is accountable is the cognizant manager of the person who is responsible. The person who is accountable is the person who must formally approve of work or sign off on the result or the decision. Those who can provide resources or can play a supporting role in the implementation of the process are supportive. Anyone who has information or a capability that is necessary to completing the work should be consulted. Anyone who has a stake in the result or is an interested party should be notified of the results. These individuals need not be consulted, though.

Our quick RASCI characterization of the information life cycle suggests that there are a combination of roles and responsibilities required for every stage. No one stage can be assigned to the business, to the information professionals, or to the technologists. The business is clearly accountable and responsible in the idea generation stage, the creation and capture stage, the security and classify stage, and in use and sharing stage. Information managers are clearly accountable and responsible in the organization and description, the discover and find stage, and the destruction stage. Information managers and the business share responsibility and accountability in the preservation and disposition stages. It is also important to note that technology does not

generally assume a responsible or accountable role in relation to information management. Rather, technology plays a supportive, consulted or informed role.

This broad perspective helps us to understand how to assign responsibilities and to define information related roles at the organizational unit level. This may serve as a working framework for identifying what roles and responsibilities exist now within a unit, where there are gaps, and how to fill those gaps. Let's assume you've been able to sketch a picture of the responsibilities currently defined got s unit. What we want to see is a well-defined framework – when assessing all the responsibilities for a single life cycle stage. We also want to see that all life cycle stages are addressed and that each stage is fully built out.

Gaps are clear problems but so is redundancy or misalignment. RASCI methods can help us to assess how well responsibilities have been assigned. If an individual has too many responsibilities (R's), they may not be able to stay on top of the assignments or support that stage as well as they should. If a unit has too many gaps, it may mean you have a potential risk or liability. Accountability roles should be evenly distributed – are they concentrated in one individual? Can they be assigned to others? What does it tell us if a stage or a process has no "R's" and no "A's? Is this a gap or is the responsibility assigned outside of the unit. Here are a few rules of thumb to use in your review.

This high level characterization is a starting point for thinking about information management roles and responsibilities. More detailed responsibilities for life cycle stages should focus on the key issues and competencies discussed in Chapters 8 through 13.

BUILDING THE WHOLE INFORMATION MANAGEMENT TEAM

In the two previous sections we considered information culture and management roles and responsibilities across the organization. In this section, we focus on roles and responsibilities for the information management professionals and practitioners. For information management strategy to succeed there cannot be competing practices, budgets or competencies. A critical success factor is a holistic view of information competencies across the information life cycle. Ideally, we have information managers with different tacit knowledge, skills and competencies, explicit and procedural know how. Organizations

should aim to establish this holistic perspective and to reinforce the 'different competencies' view in job descriptions and recruitment. At this point in time, organizations cannot depend on education and training programs or professional associations representing different areas of practice to provide this foundation. Ideally, we can achieve a shift in the next ten years by establishing stronger education and training programs for information management. The education and training market will respond if organizations create a demand for information managers with full life cycle competencies.

In the meantime, what are the basic competencies and characteristics you should be recruiting for or developing in your information management staff? Think back to the areas of practice and types of information we described in Chapter 3. You should look for individuals who:

- Understand all phases of the information life cycle and the various guidelines, issues and technologies that support each phase;
- Have broad experience in working with all kinds of information;
- Have strong learning competencies and interest in mentoring and coaching others;
- Understand the business value of information assets;
- Can work well with the business
- Demonstrate strong information culture attitudes and behaviors, and is a key factor in the development of information culture development and assessment
- Are well connected to all of the information areas of practice and has an extensive network of professionals from whom to seek advice and guidance

A BUSINESS STORY: A CASE OF COMPETING CULTURES

The Business Environment

This story comes from an organization that provides policy and technical advice and guidance to communities and local officials on environmental issues and concerns. The internal business environment resembles a coordination model. Because effective guidance and advice means understanding local environments and cultures, the organization is comprised of a broad range of individuals representing those cultures. By definition, there is a complex

information culture which reflects multiple national and religious cultures, gender cultures, functional cultures of the staff. Functional cultures are also complex because environmental sciences draw from many different disciplines, and its application is to a variety of geographies. This means involving different regions and countries, different scientific disciplines, programmers and financial accountants, and information managers. This use case describes the variety of cultures in play in a single division of the organization where the Vice President represents an financial culture and a given religious culture. This individual has no scientific or information management background but relies on his direct reports to advise him on these issues. He is a political appointee with a long history coming up through the ranks of the organization. The direct report for environmental sciences represents a similar regional culture but a different religious culture. The direct report for information management represents yet another regional culture and a third religious background. The president of the organization represents yet another region and another religious background. This individual has a combined art and financial background, and a particularly strong focus on information management and use.

The Business Critical Challenge

The president discovers that there are significant gaps in access to critical environmental information across the organization and charges the Vice President to rectify this situation. This is perhaps one of the most challenging behaviors to change, though, because so much of information management is dependent upon the respective information culture of the individuals subject and business experience. And, this is a very complex organization.

The Business Response

The strategy developed by the IM expert was well conceived and well formulated. The Vice President calls in his direct report with expertise in information management who develops a multipronged strategy to address the situation. The expertise resided within the information technology division. Meanwhile the President embarks on a campaign to raise awareness of the issue and to incorporate strong information principles into the core principles and behaviors of the organization. There is a new module on information ethics developed for all new incoming staff. While the IM Director is working on

developing and implementing the new strategy, the Vice President continues his traditional behavior of holding information close and requesting multiple solutions from across all of his team. The signals he sends to his 500 staff are tacitly in contradiction with those the President and the Information Management Director have espoused. The staffs across the division follow the lead of the President, but over time they learn that their direct managers and Vice Presidents may be following a different set of principles. While every staff member now has an established item in their performance evaluation for information management, these assessments are not treated seriously. Staffs learn how to manage these assessments, and the behavioral changes are not realized.

The Result

Where the cultures of other Vice Presidents were closely aligned with those of the President there was widespread adoption of the new information culture. However, the adoption and uptake was uneven across the organization. Where there were strong and well established Vice Presidents, particularly those with extensive ties and networks across the organization, the existing information cultures remained in place. Because all performance assessments were ultimately responsibilities of the Vice Presidents, the incentive to perform as expected within the division was greater than the incentive to perform to the president's expectations.

A Strategic Approach

The regional and business background of the President may have blindsided him from understanding the complexity of the cultures of his Vice Presidents. The president might have first consulted with the cultural assessment experts in his HR division to understand how to best design and implement the new strategy. A better strategy might have been for the President to establish a new role within his office and among his direct report staff to oversee this new initiative. In that way, the intervening cultures and relationships might have been more effectively influenced by the president. In this approach the Vice Presidents rather than individual staff would have been held accountable for the information behaviors of all of their staff. If the President had made it clear that these individuals would be evaluated on the overall performance of

their staff, a cultural change would have been possible. In addition to adding a new assessment item in staff performance evaluations, a new 360 evaluation mechanism for Vice Presidents might have been implemented.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to…

- Describe the relationship of culture and strategy
- Discuss the three elements of organizational culture
- Differentiate organizational culture and information culture
- Provide examples of basic assumptions and beliefs related to information assets
- Provide examples of values, norms and behaviors related to information asset management
- Provide examples of information related artifacts
- Describe formal and informal culture assessment methods
- Explain how to build culture into the everyday working environment
- Define those intellectual capital factors most closely associated with culture
- Describe at a high level the apportionment of roles and responsibilities across the information life cycle
- Describe the characteristics of a strong information manager

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Chapter 15
The Cost of Managing Information

ABSTRACT

This chapter focuses on budgets, financial decisions, and costs to support your information strategy. The chapter explains the basic types of costs to consider and how costs are treated from a cost accounting perspective.

BUDGETS, FINANCIAL DECISIONS AND STRATEGIES

In the last chapter we talked about how culture can undermine your strategy if they are not aligned. Budgets and everyday financial choices can also eat your strategy for breakfast. If we make decisions based on budget and financial resources – a different kind of capital asset – rather than on information assets and their life cycles – we negate our strategy. We need to think differently about the kinds of investments we make in information assets – to see them as types of costs and costs that can generate value or liabilities. As we'll see working through the life cycle stages in this chapter, each stage involves different kinds of costs and carries different kinds of liabilities. When we treat information assets as a business by-product rather than an asset with a life cycle – we undervalue the investments and underestimate the liabilities.

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Seeing information asset from its life cycle stages is the fundamental shift required to succeed in the information and the knowledge economies. From this perspective we shift from seeing financial and physical assets as the key decision point to information assets. To help us shift the perspective, we take a cost accounting approach. A formal cost accounting approach also helps us to think of and treat costs and liabilities in actual value.

COST ACCOUNTING AND INVESTMENTS

The term cost has many formal and informal meaning (Drury, 2013; Horngren, 2009). In its simplest form it is the amount that has to be paid or spent to buy or obtain something. Our focus in this book has been on information as a capital asset. Capital assets have costs. By costs we sometimes mean the amount that we invest in capital assets to derive value. By costs we sometimes mean a liability – something that is owed for the asset or a deficiency or negative value that is created by the asset. The goal of this chapter is to clearly differentiate between costs, investments and liabilities.

Cost Accounting, Costs and Investments

The context for discussing costs is cost accounting. Cost accounting is an accounting method that describes a company's costs of production taking into account both the variable input costs of each stage of production and the fixed costs required to support production. Cost accounting compares inputs to outputs to better understand financial performance. In the context of cost accounting for information assets, this means considering the full range of cost types, including direct costs, indirect costs, fixed costs,

Kinds of Costs

In cost accounting, there are eight kinds of costs, including direct costs, indirect costs, fixed costs, variable costs, operating costs, sunk costs, and controllable costs. Concise definitions and examples from an information asset context are provided below.

- Direct costs are related to producing a good or service and include materials, labor, expense, or distribution costs. Direct costs can be traced to a product, department or project. For example, all of those costs associated with producing a technical report, an internal policy memorandum or a formal publication.
- Variable costs are costs which change as the level of production and the number of outputs change. As you produce more technical reports or publications, the costs of publishing and actual physical production will increase. If you produce fewer internal town halls from the CEO, the cost of staging, speech developing, recording and streaming with decrease.
- Indirect costs are expenses that are not related to producing a good or service. These kinds of costs do not easily trace to products, departments or projects. For example, indirect costs associated with identifying the requirements for a content repository or the resources required to develop a rigorous definition of harm for use in security classifications. Ultimately, these efforts will support two stages in the information life cycle, but they are not directly accounted for as information assets or products.
- Fixed costs do not vary with the number of goods or services a company produces. For example, an organization purchases an automated indexing application for $200,000. The purchase is a fixed cost, although the application is used in the production of metadata for all of the organization's information assets.
- Sunk costs are costs that were incurred in the past and are not considered in budget decisions going forward. An organization has already committed to these costs – they are unavoidable or unrecoverable. At this point, if they are not redeemed or paid off in full they move from a cost to a liability.
- Controllable costs are expenses managers has control over and have the power to increase or decrease. In fact, costs associated with information asset production and management are typically considered as costs that are not controllable in this sense. They are either treated as human resources or personnel costs, software and technology costs or supply costs.
- Operating costs are expenses associated routine business processes and capabilities. Operating costs are not traceable to any one product. Operating costs include the costs of maintaining facilities and utilities.

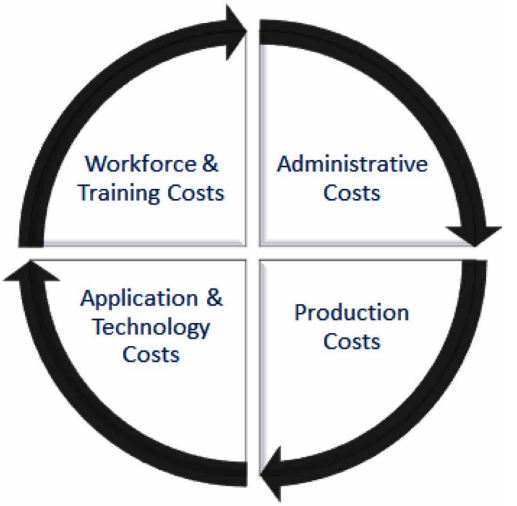
Cost Factors in the Information Life Cycle

Looking across the information life cycle, we find four general categories of cost factors, including (1) administrative and management costs, (2) processing and production costs, (3) application and technology costs, and (4) personnel costs. What is included in each category, and how do these factors align with our characterization of the information life cycle?

- Administrative and management costs are one-time sunk costs. They include human resources (administrative salaries and project time estimates), communication costs (communication methods and systems, salaries and time of communication specialists), Policy Development (administrative and analysts salaries), general human resources costs (human resources personnel engaged in recruiting and building a workforce, developing job descriptions, overseeing performance assessments), and meeting and Consultation Costs.
- Process and production costs are the costs associated with supporting information asset management across the full life cycle. They also include information management application and technology investments. Information asset management costs associated with processes are more likely to be variable and direct costs, whereas information application and technology investments are more likely to be indirect and fixed costs. In fact, technology and application costs may also be treated as sunk costs. We also note here that although software and technology are used to support the creation and management of information capital assets, they are accounted for as a different kind of capital asset – generally as physical capital assets.
- Workforce and personnel costs are recurring operational costs. In addition to human resources and workforce building activities, we also include here training and learning program development and delivery costs. These kinds of costs are both one-time sunk and recurring operational costs. Training delivery is an ongoing

Because we typically do not think of information as an asset, we tend to not associate these kinds of costs with information. To begin to shift our thinking, it is important to have a point of reference and a set of thinking points. In fact, these cost factors have a natural alignment with the issues and decision points presented in Chapters 8 through 13. Specifically, administrative and

Figure 1.



management costs tend to align with the "What" and "Where" questions. These questions tend to highlight the development of policies. Processing and production costs tend to align with the "How" questions. Application and technology costs tend to align with the "Where" questions. And, workforce and personnel costs tend to align with the "Who" questions.

COST ACCOUNTING AND LIABILITIES

Costs and Liabilities

A liability is something that an individual is responsible for – a legal debt, a deficit or an obligation. Liabilities are deficits – they draw value from what should otherwise be a positive value. In the context of information capital asset management, a liability is something or some action that diminishes the value of an intellectual capital asset. We tend to think about information liabilities as simple poor performance or decision making. This masks the financial, reputational and intellectual capital impact to an organization. We include ten examples of situation that have produced liabilities to increase our understanding. Each of these speaks to the need for strategic and thoughtful management of information.

Liabilities can be a debt or something that is owed but was a good investment. In this case, the liability will be paid off in due time as the organization continues to draw benefit from the investment. In this case, the cost of the liability is balanced with the benefit it produces. In other cases, though, a liability has or generates a negative value or a deficiency. In Chapter 1 we reviewed several kinds of liabilities that resulted in deficiencies. These included opportunity costs, lost investments, information assets that were missing when they were needed, unauthorized access or presence of information, misappropriation or forged information, use of unvalidated or untrustworthy information assets, loss of information assets, use of low quality or junk assets, the presence of duplicative or redundant assets, and the existence of negative information politics versus a positive information culture. Any of these actions can generate a liability for an organization. How we account for these negative values and how we correct or prevent these liabilities is directly related to how we account for the costs associated with information assets. To the extent that we associate no negative cost or expense with having made these mistakes, they will continue to occur. They will continue to be treated as simply bad management decisions. If we shift out thinking about costs and of information as a capital asset, we will also shift our thinking about liabilities.

Factors Contributing to Negative Liabilities

In Chapter 1 and above we provided examples of information-related liabilities. What are some general causes of liabilities? How can we prevent liabilities before they occur or at least mitigate their impacts when they do occur? The answer lies in strategically managing your information assets. Specifically, liabilities occur when information asset management strategies:

- Are not reasonable for the business context and future
- Are not suitable to the organization's business goals
- Are not supported by a productive and positive information culture
- Is not focused on the management of information as a capital asset

We avoid choices which are unreasonable by understanding how to balance the resources we have with the value we need, by ensuring that there is a holistic and measured approach to managing information assets across practices and across the life cycle. This means making choices that make sense in our strategy. We avoid choices that are unsuitable by making sure

that each decision we made and each action we take aligns with the future external and internal business directory of the organization. This means making choices that are relevant to and aligned with our strategy. We avoid decisions and actions that create or reflect a negative and dysfunctional information culture by thinking ahead to the consequences of our actions and by clearly calling out the costs and liabilities of negative and dysfunctional information cultures. Making decisions and taking actions that focus on information as a capital asset and consider costs, investments and liabilities is the best way to avoid poor information management choices.

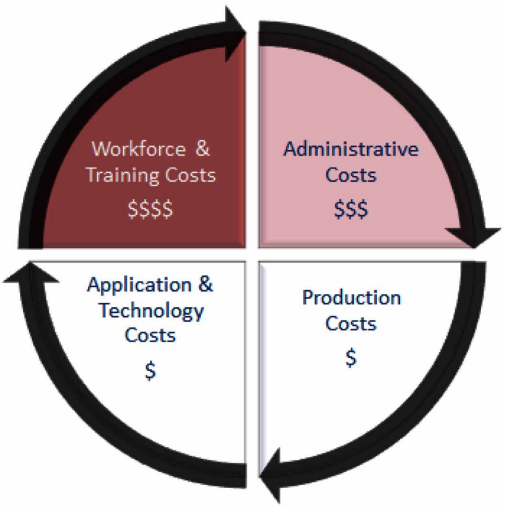
COST MODELS FOR STAGES OF THE LIFE CYCLE

Costs and liabilities are discussed for each stage of the information life cycle. The key cost factors used to determine levels of investments are drawn from Chapters 8 through 13. Cost models for each stage of the life cycle remind us that there are significant variations across the stages. This perspective is different than how most organizations manage information asset costs, investments and liabilities today. Most organizations think in terms of information management staffing and workforce costs, information systems and technology investments. Understanding the variations in key decision and investment points across the life cycle will help us to manage investments and liabilities much more effectively. In the end, this supports and sustains our near and long term strategies.

Stage 1 - Breakdown of Cost Factor: Idea Generation

Stage 1 focuses on the creation of ideas and knowledge that when encoded and made tangible either digitally or physically become an information asset. In this stage, only two of the cost categories have significant dollar investments: workforce and training, and administrative and management (Figure 2). Investments in workforce and training are vital to ensuring that individuals understand that information is a capital asset, that these assets have value, and that each staff fully understands and is trained in their information management responsibilities. This may include the development of online or in person training programs, the administration of these programs, perhaps internal certification of individuals, and the formal assessment of staff information management performance. Also in the workforce and training

Figure 2. Cost model for stage 2



category we include any costs to train managers and leaders in how to create and nurture a productive information culture. Administrative costs include the development of policies related to information as capital assets. These policies must address all of the issues covered in Chapters 1, 2 and 3. They also include the development of information management strategies – near and long term. It is at Stage 1 that the fundamental culture takes hold.

When Stage 1 investments are made in these key categories, the value will be reaped throughout all of the remaining stages of the life cycle. If investments are not made in these key categories in Stage 1, several negative liabilities will result. Information will not be valued or understood as a competitive asset. Where there is a fundamental gap in the information culture and in lack of belief in the importance of managing information, it will not be captured. There will be no foundation for strategic information management. There is no level of economic transformation today or in the future where information will not be a competitive asset. There is no economic sector where information will not be a competitive asset.

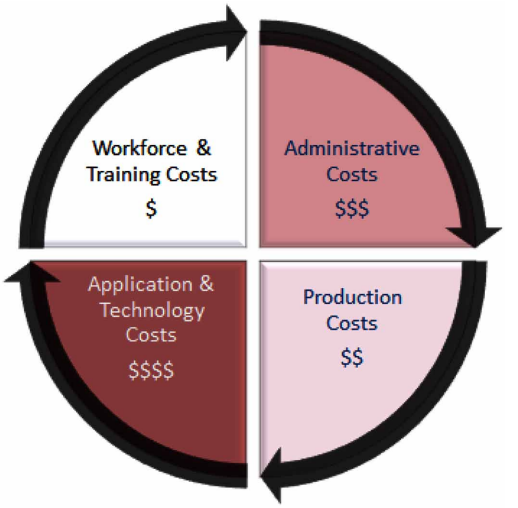
Stage 2 - Breakdown of Cost Factors: Create and Capture

Stage 2 focuses on the initial physical or digital representation of ideas and knowledge – the first attempt to capture and encode those ideas that were created in Stage 1. Without Stage 2, information is not captured, it will not be

secured, it will not be organized to support discovery or use, and it cannot be preserved to continue to derive value in the future. Investments in application and technology and administrative and management categories are critical to a healthy and productive Stage 2 (Figure 3). Applications and technology investments are critical. They include content management systems, digital asset management systems, records and document management systems, web content management systems, network drives and structures, personal storage systems, scanning software to find resources wherever they may be stored, unique identification systems, formatting software for rendering and converting assets, format viewers, and servers. It also includes basic office management, word processing, audio and video recording applications. This stage also includes all communications and social media applications. While long, this list is illustrative rather than exhaustive.

When Stage 2 investments are made in these key areas, we have a strong foundation for supporting the strategic management of information assets. If investments are not made in these key categories in Stage 2, several negative liabilities will result. Tangible information assets will be managed in a haphazard way. The greatest threat, though, to an organization at this stage is poor decisions about applications and technology to support creation and capture. These applications and technologies are among the most expensive an organization can acquire. These are also sunk costs which carry significant

Figure 3. Cost model for stage 2



opportunity costs. Poor decisions in document management decisions can result in a sunk cost of over $1 million dollars. If that document management system is poorly configured, if the software cannot support a highly networked and federated working environment, additional investments will be required. If the system does not support the way people work, they will not use the system or they'll find ways to work around it. Not only might there be sunk costs and wasted investments, but there may be negative impacts in terms of trust in the information culture. Another example of a poor decision is the purchase of multiple applications with no fundamental design or consideration of how the applications will work together. A poor decision at this point will have significant implications for all of the subsequent stages. Efforts to manage information at each subsequent stage will require a greater investment that would have been required for a clean and well-designed foundation.

Administrative and management investments are also important here. Time and effort is required to think through and develop policies to address all of those "What" questions laid out in Chapter 8. Ideally, policies should be defined before any software or technologies are selected to ensure there are no misalignments. Chances are high, though, that you already have multiple and conflicting policies in place. In that event, administrative and management investments are needed to ensure the variations are synthesized and harmonized.

Processing and production costs are not insignificant but they are likely to be less than the software, technology and administrative investments. Processing and production literally focuses on how individual information assets are identified, designed, formatted, stored and registered across the organization. This Stage will fail where no investments are made in processing and production – where this is a task added to everyone's job description with no offset of costs and time. This highlights the final cost category – workforce and training. It is not sufficient to assign responsibilities to create and capture information to all staff without providing some guidance and training.

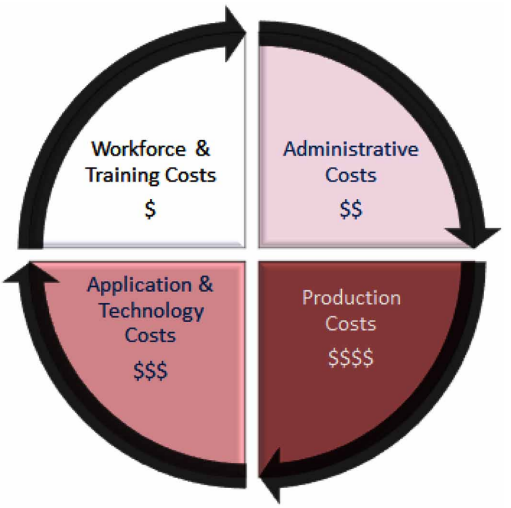
A failure to choose an applications and technology foundation that is suitable to the organization and its business goals, that are reasonable for the organization's resources and its staff competencies will create significant liabilities.

Stage 3 - Breakdown of Cost Factors: Security and Classify

Stage 3 focuses on the securitization and classification of information assets throughout the organization. Stage 3 is the most important stage for ensuring that information assets are neither unintentionally disclosed nor accessible to those who are not permissioned to use them. Investments in all four categories are important to the success of this stage. Administrative and management investments support the development of policies and the communication of those policies throughout the organization. Investments in software and technology are important infrastructure for managing security – scanning software, generation of security tokens, construction and maintenance of firewalls, securing of servers, applications, repositories and in some cases entire locations. The greatest investment, though, is in securing individual assets – as each new asset is created, captured and stored – and as each of those assets moves through its full life cycle. Investments in workforce and training are also important though they are significantly less than those made in processing, applications and technologies.

When good decisions and investments are made in all four categories, the risk of liabilities is reduced. Common liabilities include the failure to adequately train staff to understand the potential harm and to assign the appropriate security class, a failure to configure software to embed security

Figure 4. Cost model for stage 2

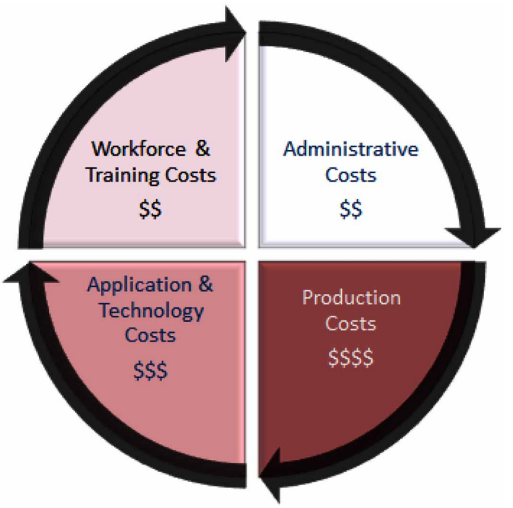


properties and token in information assets, failure to manage copies of assets and to prevent variant security classes being assigned, and the inadvertent or intentional disclosure of an asset.

Stage 4 - Breakdown of Cost Factors: Organize and Describe

The organization and description of assets is second in importance only to the creation and capture of information assets. Organization and description is prerequisite for discovery and finding information. Without the metadata and the reference sources used to generate metadata, search and all forms of discovery will be suboptimal. Investments in all four cost categories are important for this stage (Figure 5). The most important category is processing and production. This is the most expensive category because every asset must be processed to some level. Processing is applied to historical, current and future assets. The second most important category is applications and technology. Software includes cataloging tools, metadata tools, metadata registries, categorization schemes and the software to support them, thesauri and semantic networks and the software to manage them, vendor interfaces, automated indexing software, automated categorization software, automated summarization software, and software to manage master data sources. Administrative and management investments are needed to establish and

Figure 5. Cost model for stage 2



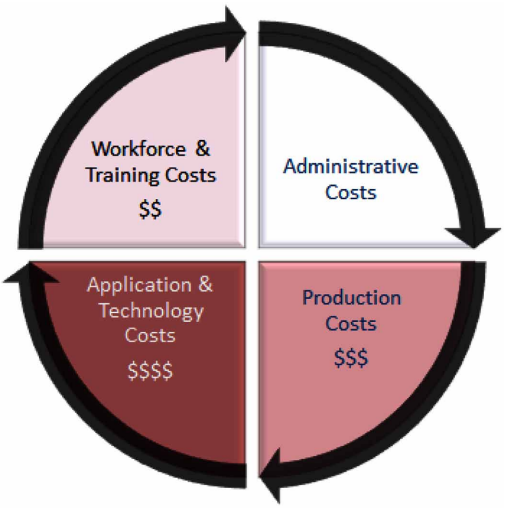
govern all of the controlled reference sources, master data sources, internal and external standards that support this stage. In addition, this stage must be supported by a well-trained and highly qualified workforce. None of the applications and technologies referenced above will function without human engineering and monitoring.

This stage provides critical information infrastructure that supports all of the subsequent stages. The challenge with this stage is that – when it is done well – it is largely invisible and intuitive. For this reason it often receives the least investment of all of the life cycle stages. How many times have you heard business managers express frustration when the topic of taxonomies or metadata comes up? In many organizations it is generally handed off to the information management practitioners as a back room or operational task to handle. It is one of the least well understood of all the stages – not only by business but also information management staff. For this reason it is also the stage where we see the greatest misalignment of competencies and processes. We fail to invest in the workforce and training that is required. Additionally, it is a stage where we tend to focus on aligning with external standards rather than with internal business working environments and needs. Where competencies are not appropriate, where standards are misaligned – staff will always find a way around the existing strategy. This results in two negative costs – the first is in the sunk costs supporting the existing strategies, and the second is in the opportunity costs of staff who invest other time to meet their business needs. These costs have an exponential effect in Stage 5 – discover and find – since the tools underpinning that stage are dependent upon Stage 4.

Stage 5 - Breakdown of Cost Factors: Discovery and Find

Discovery and finding information assets are the most visible and clear benefit of information asset management to the business. Being able to find current and historical assets is fundamental to leveraging their value. This stage is dependent upon applications and technology first and foremost, and then on the effective indexing of those assets in search. Chapter 11 highlights all of the search options available to an organization – beyond the basic functionality. These include federated or centralized search, faceted or full text search, enterprise search, site-specific search, and source specific search. An additional investment for multi-lingual search architecture may be needed depending on the nature of the content and stakeholders.

Figure 6. Cost Model for Stage 2



In this stage of the life cycle, application costs are the most significant. Application investments include search system software, personalization software, syndication software, recommender systems, search analytics, and all of the controlled reference sources that are needed to configure search. Search systems can also be resource intense depending on how often and extensively indexes are built, refreshed and rebuilt. This may involve high technology infrastructure investments. The cost of search system technologies is second only to the cost of content and document management systems. Personnel and training investments are also critical, though. Less is known about how to configure and design search systems than content or document management systems. Investments in search technologies are sunk costs – but when those who are tasked to configure and maintain them do not understand the components and their functionality, these sunk costs turn into significant opportunity costs. There are stories of organizations that spent up to $5 million on a search system only to learn that its basic design and performance restrictions were unsuitable to the internal working environment. Additional investments in administrative and development work added to the total cost. In the end, the effort cost close to $15 million and had no visible benefit or value to the organization. Depending on the nature of the content and the potential harm of accessing content inside a firewall, a distinct set of search indexes may be required outside the firewall. Administrative and management costs result from the policies and designs for the overall search system architecture.

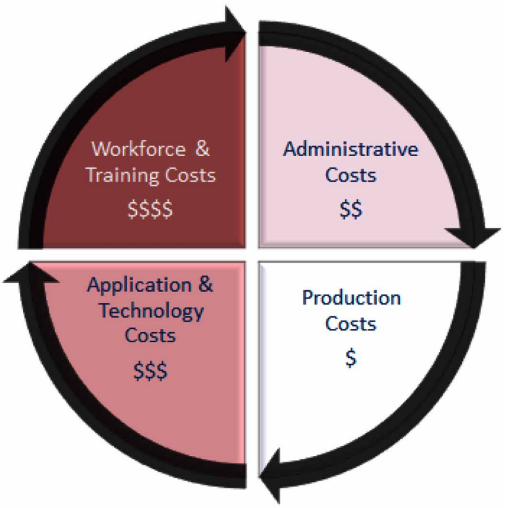
We should also mention that this stage is heavily dependent upon a strong Stage 2 – securing and classifying of content. Discovery and finding – via search – is the primary channel through which information assets may be inadvertently or unintentionally made available.

Stage 6 - Breakdown of Cost Factors: Using and Sharing

This stage of the life cycle is heavily dependent on human behavior and information culture. Logically, the most significant investments are to the workforce and training category – incentivizing sharing behavior, rewarding use, building using and sharing indicators into individual performance assessments. The second most significant investments are to systems that make information assets accessible and usable – applications such as circulation, lending, borrowing, asset formatting and digitization. Application development and configuration also includes ensuring that these systems are designed for usability, ease of access, ease of retrieval, and trust. Administrative and management costs are primarily focused on the development of policies to support use and sharing and the promotion of sharing throughout the organization.

Liabilities in the form of negative costs – opportunity costs – occur when the organization does not use its own information assets. Where the culture rewards recreation or reinvention of ideas – essentially the duplication of

Figure 7. Cost model for stage 2

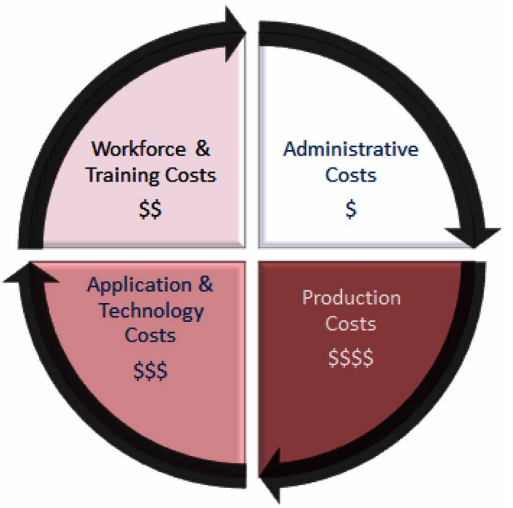


existing ideas – the organization incurs costs twice. The value of the information management investments up to this stage will have been for legal or regulatory compliance. Where compliance is the goal rather than use and competitive advantage, it is important to balance costs – to make sure they are reasonable and suited to the purpose. Investing in a healthy information culture is critical where competitive advantage is the goal. Investments in making assets easily accessible and usable are critical. Search and discovery are important but they are not sufficient to putting the asset into the virtual or physical hands of the potential user. The asset must be understandable, trustworthy, and usable. This stage is heavily dependent upon Stage 2 – the goodness of creation and capture determines how accessible and usable assets will be.

Stage 7 - Breakdown of Cost Factors: Preserve and Dispose

The highest dollar investments in this stage fall into the processing and production category. Every asset that has been captured in Stage 1, secured and classified in Stage 2, described and organized in Stage 3 must either be disposed of or preserved for long term retention. This means that every asset must be found, touched, appraised and a decision made according to its

Figure 8. Cost model for stage 2



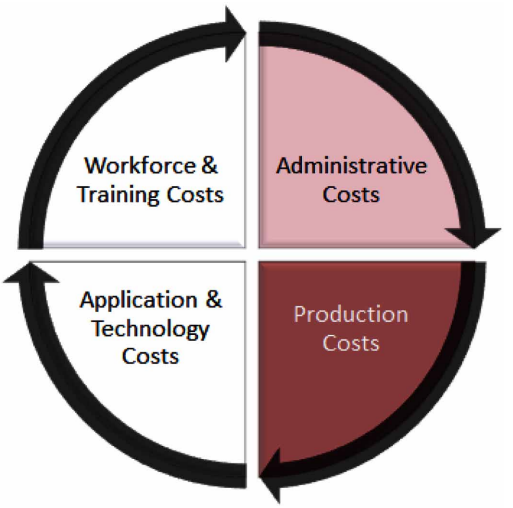
records status and schedule. This is a labor intensive process which relies on specialization application software. That software may be embedded in the source application or may be an entirely different system. Distinct systems may be records management or archives management systems. Both of these applications are costly. Beyond the systems themselves, there are associated services that require technical support including offsite storage, dedicated and isolated servers, and watermarking. Some of these investments may be similar to those made for Stage 2. Workforce and training costs may also be significant though this stage tends to be a specialized area of practice with fewer dedicated staff. One staffing model is training individuals throughout the business to perform this task for individual units. In this model costs may be distributed and bundled into existing business staff costs.

When the practices of disposition and preservation are isolated from other information practices there may be a tendency to duplicate the work of stages 1 through 6. This creates barriers and challenges to discovery and access. Duplicate systems or duplication management practices mean additional effort to integrate and harmonize search systems. Duplicate efforts may mean redundant investments in labor. The duplication of effort may also pertain to the development of reference sources such as subject categorization schemes, master organization and administrative data sources, or content and document types.

Stage 8 - Breakdown of Cost Factors: Destroy

Asset destruction is a labor intensive task which involves touching – either virtually or physically – every object for final review and destruction. Because processing is labor intensive there is no opportunity to achieve economies of scale – there is simply a labor ceiling for handling each item. There are additional processing costs associated with the administrative work to record the destruction of assets. The second greatest cost category for this stage is administrative and management – establishing the policies for destruction and ensuring that those policies are effectively communicated across the organization. It is important to enforce destruction policies where they are in place and supported by retention and disposition schedules. In some cases, the retention of assets that should have been destroyed can present a legal or regulatory risk to the organization – particular in the event of legal discovery or records hold orders.

Figure 9. Cost model for stage 2



The investments in application and technology are low here because they leverage investments made in earlier stages. Additionally, this stages leverage workforce and training investments made in earlier stages. The risk and liability for this stage is that it will be overlooked – investments will not be made. As a result assets that should have been destroyed remain, physical storage costs continue to increase and the size of digital repositories continues to expand dramatically.

COST FACTORS ACROSS THE INFORMATION LIFE CYCLE

What can we learn about costs by looking at investments and liabilities across the information life cycle? The first observation (Figure 1) is the simple variation in types of investments across each stage. For example, processing and production costs are the highest in four of the eight stages – organize and describe (Stage 3), discover and find (Stage 4), preserve and dispose (Stage 7), and destroy (Stage 8). This observation is at odds with how we manage and invest in information management – we tend to focus on salaries, application software and technology. Application and technology costs are greatest for stages 2 (create and capture) and stage 5 (discover and find). Workforce and training costs are highest for those stages which rely on business

Table 1. Variations in costs across information life cycle stages

Life Cycle Stage	Administrative & Management Costs	Processing & Production Costs	Application & Technology Costs	Workforce & Training Costs
1	Low Costs	Medium Costs	Low Costs	High Costs
2	Low Costs	Medium Costs	High Costs	Low Costs
3	Medium Costs	High Costs	Low Costs	Low Costs
4	Low Costs	High Costs	Low Costs	Medium Costs
5	Low Costs	Low Costs	High Costs	Medium Costs
6	Medium Costs	Low Costs	Low Costs	High Costs
7	Low Costs	High Costs	Low Costs	Medium Costs
8	Low Costs	High Costs	Low Costs	Medium Costs

participation – idea creation (stage 2) and use and access (stage 6). Natural variations – and appropriate levels of investments – are overlooked when the cost of information management is treated either as a major investment in technology or human resource activities and staff salaries.

Managing costs also means managing risks and liabilities. Risks and liabilities vary across the information life cycle just as do investments. The best way to minimize risks and liabilities is to understand them in the context of the information life cycle. Figure xx summarizes the probability of risks and their impacts across the life cycle. As a context for assessing risks and liabilities we refer back to those choices and effects that might undermine your strategies – choices that are unreasonable for the organization's resources and business situation, choices that are unsuitable to the internal and external business environments, the nature of the organization's information culture, and how day to day information management decisions are made. Clearly, unsuitable choices – decisions that are not aligned with the current and future external and internal business environments – present the highest overall risk to information asset management. Poor day to day information management decisions and unreasonable choices also carry high risks.

There are liabilities in every stage of the life cycle (Table 2). The life cycle stages with the highest liabilities are Stage 5 (Discovering and Finding) and Stage 7 (Preserving and Disposing). The liabilities are high here because of the actual dollar value of poor decisions and choices. The stages with the lowest overall liabilities are Stages 1 (Idea Generation) and Stage 6 (Using and Sharing). While these stages may have a lower negative dollar value, the most significant risk is the failure to leverage value from information assets. We mask all of these risks and liabilities when we think of information

Table 2. Nature of risk across life cycle stages

Life Cycle Stage	Unreasonable Choices	Unsuitable Choices	Information Culture Impacts	Information Management Decisions
1	Medium Risk	Low Risk	High Risk	Low Risk
2	High Risk	High Risk	Medium Risk	High Risk
3	Medium Risk	High Risk	Medium Risk	High Risk
4	High Risk	High Risk	Medium Risk	High Risk
5	High Risk	High Risk	High Risk	High Risk
6	Medium Risk	High Risk	High Risk	Medium Risk
7	High Risk	High Risk	High Risk	High Risk
8	High Risk	High Risk	Medium Risk	Medium Risk

management as a support function rather than a part of every core business capability. When we fail to manage information as an asset and throughout its life cycle, we increase the probability of incurring these risks and liabilities.

There is a high probability that your near and long-term strategies will be ignored and undermined where day to day decisions are made outside of the life cycle model. Protecting your information management strategies means ensuring that they are lived each day, that each decision is made in the context of the information asset and its life cycle stage. The challenge here is that neither the business nor information professionals are trained to think of information assets as assets or their life cycles. This challenge requires a shift in mental models and management behavior but it is one that is essential for success in the information and knowledge economies. Organizations that have met these challenges are clearly high performers in the new economies.

A BUSINESS STORY: A UNIQUE SITUATION

The Business Environment

This story comes from the criminal investigation and law enforcement field. The organization has a high reputation and is widely trusted in its field. Its internal business environment resembles a coordination model. Processes are standardized across field offices. Over its history, the organization has perfected investigative and analytical methods. The organization has a very healthy respect for information and for information management. In fact,

the organization was one of the first in its field to have formal information management applications available to its entire staff. The organization has a strict code of ethics and peer processes for handling and reviewing information. Information is highly securitized.

The Business Critical Challenge

Because the organization was an early adopter of information management solutions its internal application is home grown and custom developed by an internal team of programmers. It is developed around an outdated operating system. It has worked well for the organization and supported the business over the decades. However, the operating system is no longer being supported by a vendor and the system in written in a language which is not widely known today. All other applications working on this system have migrated to other platforms or been ported to commercial applications. Additionally, the architecture is mainframe based and the organization has adopted a client-server and web based foundation. The organization begins to collect requirements and develop specifications for a new information management solution. The rich custom development tradition has created an expectation that every requirement can be met by contacting the internal engineers. The costs of development have been hidden for many years because they consist primarily of staffing and engineering costs. Requirements are finalized through extensive consultation across the organization – there is no critical review of the requirements. The requirements suggest that the organization represents a unique situation that may be difficult to satisfy with a commercial product

The Business Response

The technical team compares the requirements to the existing information management products on the commercial market. The closest any commercial application comes to satisfying the requirements covers about 40% of the requirements. Given the situation, the organization decides to undertake a new in-house custom development project, one that is built on a well-supported and widely used operating system and in a programming language that is well supported among developers. The requirements are converted to a design document – and development work begins.

The Result

The changing technology environment means that a new system is far more expensive to develop and deploy. Staff costs have increased significantly in twenty years since the last system was developed. The project costs run over budget in the first year and continue to grow. The project is still incomplete after five years. An initial pilot test is scheduled of the core functionality in a limited number of departments after five years. The system fails to perform in the pilot test. The primary challenges are response times given the new baseline architecture – and the significant loss of functionality from the earlier system. After an internal review of the situation, the chief executive closes the development project. To resolve the situation quickly – since the organization relies on its information management applications – the chief executive makes a decision to adopt the application that is used by many of its peer organizations. There is no analysis of the goodness of fit of the application to the organization's requirements. There is a significant loss in functionality and an impact to the organizations ability to effectively and efficiently work with information – analysis and tracking suffers as a result

A Strategic Approach

A better approach would have been to begin with a market review of available commercial products and a critical assessment of the existing functionality. The initial requirements gathering did not critically review the requirements to identify mandatory and recommended features. A better approach would have been to conduct site visits of organizations using the commercial applications to determine where custom development was possible and where it presents a risk. This approach would also have allowed the organization to focus on current and future needs, rather than focusing on the past. Another strategic action would have been a critical assessment of current processes and practices – taking an opportunity to consider whether there are improvements to efficiency or effectiveness that might be achieved. As is often the case, a custom-developed system may tend to calcify processes and create opportunities for short term fixes. The ease and comfort level with an in house develop may prevent an organization from undertaking that periodic critical review that is so important to understanding and adapting to changing business environments. In the end, this strategy would have clearly defined how the organization was similar to and distinct from other organizations.

CHAPTER TAKEAWAYS

After reading this chapter, you should be able to

- Explain the relationship of day to day decisions and strategy
- Explain the definition of costs in a formal cost accounting context
- Explain types of costs as investments
- Explain costs as liabilities
- Describe potential sources of liabilities
- Discuss the variation in investments and costs by life cycle stage
- Discuss the variation in risks and liabilities by life cycle stage
- Explain the consequences of ignoring costs at the life cycle stage
- Explain the importance of managing the costs of information assets directly throughout their life cycle

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Appendix

PULLING IT ALL TOGETHER

Explaining the Checklist

This appendix is comprised of checklists. A checklist is a simple aid for managing a complex set of tasks. Checklists are intended to help the reader plan and track progress towards establishing a living business-driven information strategy. Checklists can serve as a foundation for identifying stakeholders, raising awareness of key topics, communicating the importance of the strategy, and defining the actions that are essential to defining and operationalizing the strategy. The checklists presented in this chapter are a synopsis of the issues and topics that have been discussed throughout the book. An organization might begin its journey by using the checklists as a roadmap. Each checklist refers back to an individual chapter – as a reference for further study and consideration. The checklists are designed to be used over time and as needed to ensure an organization continues to move its strategy forward and to ensure it continues to be relevant to and supportive of business goals.

The checklists are ordered logically into 15 steps. Each step is broken down into tasks which align with the topics discussed in the individual chapters.

- Steps 1, 2 and 3 are intended to raise awareness of the business value of information assets. These steps focus on building mental models and helping managers to understand what they have to work with, why it is important to manage information assets, and the challenges and opportunities they face as they move forward.
- Steps 4, 5 and 6 focus on raising awareness of the design and content of strategies, the development of a long term business vision for information assets, and taking stock of the current state.

- Step 7 focuses on the development of a business-driven governance model for information assets
- Steps 8 through 13 focus on developing an understanding of and taking stop of how information assets are or are not currently managed throughout their life cycles.
- Step 14 focuses on raising awareness of information culture at all levels of the organization and suggestions actions that enable an organization to manage and nurture a positive business-driven information culture
- Step 15 focuses on raising awareness of and development models and methods to track costs of managing information

How to Use the Checklist

Chapter by chapter, the book has walked the reader through the key issues and activities. Because the book will be used by organizations that are at different stages of the information asset management, the reader may want to consider using the checklist to assess where you stand.

The checklists are blank forms which can be expanded to suit your business needs. The checklists are a reminder that your strategy must be your own and it must align with and be reasonable for your business environment. Organizations can use the checklists to do the following:

- Assess and assign responsibility for determining the current state of the organization in achieving business-driven management of information assets
- Identify and involve all stakeholders, both current and future, in the practicalities of planning and accomplishing your goals
- Define the actions and activities that need to be completed in order to support your strategy. The what, who, when, where, and how questions outlined in Chapters 8 through 13 should provide practical guidance on what you need to know in order to develop a strategy that suits your business goals.
- Finally, formulate a strategy for near and long term strategy

Appendix

Table 1. Step 1

Step 1. Raise Awareness of Information Capital Assets **For further discussion of the activities and actions discussed in Step 1, please refer back to Chapter 1.**
Raise awareness of the organization's information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Raise awareness of the organization's information liabilities
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify and address the organization's perceptions of information management challenges
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Table 2. Step 2

Step 2. Engage the Business to Take Ownership of Information Strategy **For further discussion of the activities and actions discussed in Step 2, please refer back to Chapter 2.**
Develop clear understanding of the organization's external business environment
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop a clear understanding of the organization's internal operating environment
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop high level understanding and representation of the organization's core business capabilities
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define a strategy that is suitable to the organization's business goals
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define a strategy that is reasonable for the organization's business goals
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Appendix

Table 3. Step 3

Step 3. Taking Stock of Your Information Management Competencies **For further discussion of the activities and actions discussed in Step 3, please refer back to Chapter 3.**
Raise awareness of the information life cycle across the organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Ensure key business managers have an understanding of the nine information management areas of practice
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Ensure key business managers understand how the areas of practice support the information life cycle
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Step 4. Designing a Business-Driven Information Strategy **For further discussion of the activities and actions discussed in Step 4, please refer back to Chapter 4.**
Raise awareness of the purpose of a living and business-driven information strategy
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define the high level structure of a business-driven information strategy
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

continued on following page

Table 3. Continued

Identify the business-critical internal and external stakeholders for an information strategy
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of and assess the value of existing information strategies across the organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define an on-going operational process to assess and update the information strategy
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Appendix

Table 4. Step 5

Step 5. Developing the Long Term Vision **For further discussion of the activities and actions discussed in Step 5, please refer back to Chapter 5.**
Raise awareness of the distinction between long term visions and strategies
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Raise awareness of the value of a long term vision
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Raise awareness of multiple views of the future – positive, negative, and neutral – and their value to information strategy development
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Increase the familiarity with and the knowledge of futuring methods
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Increase the familiarity with and the knowledge of futuring methods
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop a rolling schedule of futuring sessions to continue to build out visions of the future
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Table 5. Step 6

Step 6. Taking Stock of the Short Term Situation **For further discussion of the activities and actions discussed in Step 6, please refer back to Chapter 6.**
Take stock of current information management strategies across the nine areas of practice
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Raise awareness of the importance and nature of information audits
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop an audit strategy that aligns with the business goals and assets of your organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Conduct an information audit of selected core business capabilities – identifying sources, assembling a team
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Establish a template for information audit reports including discussions of results, gaps and remedies
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Translate the results of the information audit to a short-term strategy
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Appendix

Table 6. Step 7

Step 7. Creating an Information Governance Capability **For further discussion of the activities and actions discussed in Step 7, please refer back to Chapter 7.**
Raise awareness of governance models and methods among business and information managers
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define the components of a governance model for information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Assess and improve the current governance models and process pertaining to information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Table 7. Step 8

Step 8. Developing a Creation and Capture Strategy for Information Assets **For further discussion of the activities and actions discussed in Step 8, please refer back to Chapter 8.**
Take stock of what information assets are currently created and captured
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of how information assets are currently created and captured
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of where information is being created and captured
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of when information is being created and captured
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of who is creating information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify gaps and remedies for this stage of the information life cycle
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

continued on following page

Appendix

Table 7. Continued

Step 9. Developing an Information Security and Classification Strategy **For further discussion of the activities and actions discussed in Step 9, please refer back to Chapter 9.**
Take stock of risks and levels of harm associated with information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of how information assets are currently being secured and classified
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of where information assets are being classified
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of who is securing information assets and when they're being secured in the life cycle
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify risks and gaps in security and develop remedies
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Table 8. Step 10

Step 10. Developing an Information Organization and Description Strategy For further discussion of the activities and actions discussed in Step 10, please refer back to Chapter 10.
Take stock of all of the methods and structures currently used to organize and describe information
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of how these methods and structures are being applied and by whom
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of where these methods and structures are being implemented
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Assess how well these methods and structures are working for stakeholders
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify gaps and approaches that need correction – propose remedies
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Appendix

Table 9. Step 11

Step 11. Developing an Information Finding and Discovery Strategy **For further discussion of the activities and actions discussed in Step 11, please refer back to Chapter 11.**
Take stock of the search systems supported throughout the organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of who is using these search systems and how effective they are in finding information
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of information seeking behavior of staff and stakeholders
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify gaps in information seeking behaviors and search tools
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop performance metrics for search and establish monitoring task
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Table 10. Step 12

Step 12. Developing an Information Access and Availability Strategy **For further discussion of the activities and actions discussed in Step 12, please refer back to Chapter 12.**
Take stock of the availability and coverage of business critical information assets across the organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of the accessibility (e.g. ease of use, interpretation, understanding, etc.) of business critical information assets across the organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify gaps and remedies to efficient and effective availability
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Identify gaps and remedies to accessibility of business critical information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Consider whether these gaps and remedies can be alleviated at earlier stages in the information life cycle
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Appendix

Table 11. Step 13

Step 13. Developing an Information Preservation and Disclosure Strategy For further discussion of the activities and actions discussed in Step 13, please refer back to Chapter 13.
Take stock of the scope and coverage of existing records schedules and retention policies
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of the understandability and implementation of records schedules and policies
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of nature of findability of archived information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of the use of archived information assets
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Table 12. Step 14

Step 14. Promoting a Positive Information Culture **For further discussion of the activities and actions discussed in Step 14, please refer back to Chapter 14.**
Raise awareness of information culture across the organization
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define and promote awareness of information culture assumptions and beliefs
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define and promote awareness of information culture values and behaviors
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define and promote awareness of information culture artifacts
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Take stock of information culture at the individual, unit and organization level
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Define and promote information management roles and responsibilities with attention to information culture impacts
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

Appendix

Table 13. Step 15

Step 15. Estimating and Managing Information Management Costs For further discussion of the activities and actions discussed in Step 15, please refer back to Chapter 15.
Raise awareness of information-related costs and budgets and the relationship of costs to business investments (e.g., assets and liabilities)
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop cost models for stages in the information management life cycle
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop measurement methods and indicators for tracking costs across stages in the information life cycle
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Develop standard reporting structures for communicating costs of managing information
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:
Raise awareness of current costs of managing information assets and encourage discussions of how those costs may be generating business value and liabilities
Status of Activity: __ Complete __ In Progress ___Not Yet Started
Action Required (if any):
Individual(s) Responsible:
Individuals(s) to be Consulted:

About the Author

Denise Bedford is Adjunct Professor, Georgetown University Communication Culture and Technology; adjunct faculty at Schulich School of Business, York University, Visiting Scholar University of Coventry; and a Distinguished Practitioner/Fellow with U.S. Department of State. She teaches graduate courses in knowledge management, enterprise architecture, semantic analysis, data sciences, and is engaged in research in all of these areas with colleagues around the world. She is Associate Editor of the Journal of Knowledge Management, and is an advisory board member of ICKM, ECKM, ICICKM and ECIC international conferences. From 1996 to 2015, Dr. Bedford was Senior Information Officer, World Bank. She retired from the World Bank in 2010 to become the Goodyear Professor of Knowledge Management, Kent State University. Dr. Bedford retired from Kent State University in 2015. Dr. Bedford holds a Ph.D. in Information Science from University of California, Berkeley, a Master's degree in Russian History from University of Michigan, a Master of Science in Librarianship, and a Bachelor's degree in Russian and German Language, and History.

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