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Leveraging Information for Innovation and Competitive Advantage

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Introduction

This paper provides an overview of what is required to create an environment to leverage information dynamically for innovation and competitive advantage. Organizations that understand the strategic benefit of this approach can dramatically improve business results and introduce innovations that change the business. In fact, according to an IBM survey of CFOs, " [organizations] with highly effective delivery of performance insight, growth insight and risk insight have higher revenue growth and are driving more value creation than their industry peers with less effective insight delivery."   However, to truly leverage information organizations must modify their traditional view of their information assets and their overall information architecture in three ways:

Think differently about information. Information is not just stored in your customer databases, file systems, content management systems or applications (e.g., ERP, CRM, and SCM). Information resides in many different repositories including custom applications, e-mails, digital images and reports. You need to make sure you are leveraging all your relevant information no matter where it originated, no matter what its format, and no matter where it resides to help your organization innovate, compete, provide service and grow. You need to understand the value of your information and to recognize and act on the importance of information quality.

Think differently about what it means to have a business solution. A business solution for information is a set of best practices that works in concert with your information infrastructure. A business solution is modular and flexible and can be adapted to changing business events. This modularity enables a loosening of the tight linkages between relevant information and applications. In addition, when metadata - definitions, mappings, and other characteristics describing how to find, access, and use data or content - is maintained in a unified way, the information becomes more modular. In essence, relevant information becomes available as a service that can be delivered in a repeatable, consistent and trusted way across the business.

Think differently about your overall IT environment. Your server platforms, storage systems, process platform, system management and security systems provide the foundation for a resilient information infrastructure. Your underlying IT infrastructure must support the organization's need to access clean and accurate information with appropriate availability, performance, cost-effectiveness and governance to drive efficiency. The infrastructure should also extend the scope of information visibility, so that blinders are removed and views are comprehensive. Some innovative organizations already are deploying solutions based on these new approaches. Indeed, they are enjoying significant benefits and are the source

of new best practices that other organizations can follow and refine as they address their own information challenges. IBM calls this approach Information On Demand - defined as leveraging information to optimize business processes, applications and productivity.

The Role of Enterprise Information

Organizations have long considered their people, their reputations, their intellectual property, and their plant and equipment as critical assets. Now there is a new entry into the list of critical assets - their enterprise information. Organizations are recognizing that information that was previously managed within departmental silos becomes a more powerful asset when it can be leveraged in an accurate, timely and consistent way across the enterprise, when and where it is needed. Accurate, complete and consistent information can be leveraged and shared more easily for organizational advantage. Indeed, the IT infrastructure can go beyond supporting business change; it can become a catalyst for changing the business. Enabling technology can lead to business innovations in areas like spotting trends, identifying opportunities or threats, improving efficiency and entering new business markets.

On the technology side, organizations need to develop an information infrastructure that helps them prepare for the future in a pragmatic way. Hurwitz & Associates recommends the adoption of a Service Oriented Architecture (SOA) strategy as the best approach to a flexible IT infrastructure that supports evolving business needs and enables high levels of reuse. In fact, SOA and Information On Demand go hand in hand. Essential to enabling a SOA strategy is an enterprise information infrastructure that can deliver, through open industry standards, trusted information as a service to applications and business processes. With this approach, organizations can avoid starting from scratch. The investments made over the years in information technology, including legacy systems, applications, databases and storage can be leveraged effectively with a SOA strategy. Whether or not organizations plan to implement a SOA, they need to take a step back and consider the value of these assets to the entire organization – not just to the department that has traditionally benefited from their use. It is not easy

Raising Workforce Productivity
A regional electric utility needed to improve communications between the field and home office for its mobile workforce. Unstructured information such as location maps, and structured information such as contract specifications needed to be available to workers in the field to improve the efficiency of contractors and field inspectors.

Using IBM software and hardware, the utility deployed a system to ensure that mobile workers including contractors and inspectors had rapid and consistent access to the information they needed. As a result, inspectors and contractors are now able to save up to two hours per day. Courier expenses previously required for speeding information to the field have been eliminated. Service calls are now handled more efficiently with fewer disruptions to traffic. In addition, the utility can keep closer track of jobs requiring permits, avoiding millions of dollars in fines associated with missing permits.

to get to the point where IT assets deliver significant benefits to the business beyond their originating departments, but it is worth the journey.

On the cultural side, organizations and departments within these organizations are often at different levels of maturity in their handling of information and consequently may need to approach their information strategies in different ways. For example, some organizations may need to start by identifying their information assets, while others may want to focus on improving data quality and consistency within the context of a specific project and with business stewards. Others may be ready to implement a comprehensive data warehouse strategy based on an industry model. Still other organizations may need to focus on rationalizing their computer systems so they have a cost-effective platform that provides the flexibility to grow as the business expands.

Organizations that tackle these issues methodically by following proven maturity models and best practices will significantly reduce their risk, improve their business processes and hone their overall business operations. They will be better able to meet regulatory requirements, bring new products or services to market and maintain a high level of customer satisfaction. They will be able to establish a consistent base of knowledge they can reuse and extend to meet their evolving needs. They will be better able to innovate and compete.

The Challenges of Leveraging Information

Organizations will be increasingly driven to take a holistic approach to leveraging all their relevant information – structured and unstructured – to face their information challenges. Just assembling, managing, processing and securing large volumes of data is very challenging. The task is made more difficult when there is a need to access and integrate information, often replicated with different degrees of accuracy, from different domains to support improved decision making. Among the challenges that organizations face when they set out to leverage their information, the following are particularly important to overcome:

- o A lack of confidence in the accuracy of information limits the organization's ability to leverage the data to its fullest potential.
- o Data and content are trapped in silos so information resources cannot be used in an agile manner.
- o The volume and variety of information are exploding at exponential rates, while today's global business environment requires faster responses than ever before.

Challenge #1: Information that can't be trusted

Let's consider an organization in the highly competitive banking market that needed to extract more value out of its information assets. This regional bank began to

acquire smaller regional banks to gain share in a high-growth market, resulting in dramatic changes in the complexity of its information assets. To be successful, the bank needed to identify its best customers in preparation for important customer marketing campaigns.

To move quickly, management required the IT organization to provide a single view of data across all of the organizations that had been merged together. Doing so was much more difficult than anyone anticipated. First the team discovered a number of inherent data problems that needed to be corrected before the data could be effectively leveraged – duplicate records, incomplete addresses, invalid entries and important data buried in comment fields. Perhaps more troubling, management quickly noticed conflicting definitions of customers, products and even prices. Simply getting a count of the customers required a common definition of a customer entity – corporation, division, account number, etc. Services needed to be identified in a consistent way, so like services could be aggregated for reporting and analysis. Interest rates and currency fluctuations needed to be reflected through a common set of policies.

To make matters worse, the initial data set was two weeks old. During that two week period, there had been a major product launch that was not reflected in the reports. In addition, the recent merger of two important customers was not reflected in the data. Therefore, a key customer relationship was strained. It was clear that business goals were in jeopardy because the data could not be trusted.

The bank found out the hard way that data systems have to be designed for dynamic use rather than for the needs of a single situation. As information was used more broadly across the expanded enterprise ecosystem – and when acquisitions introduced new sets of information to be absorbed, rationalized and leveraged – inconsistencies were magnified. Ultimately, management was forced to take a step back and bring in assistance to assess the information environment and recommend changes to meet the needs of the organization. In essence, the company needed new and dynamic approaches to leveraging the value of information across a growing enterprise.

Challenge #2: Data silos that prohibit agile data access
Now consider a large manufacturing company that was decentralized, with each department managing its own data. Each department had established its own data marts as a way to consolidate key customer and product data. When a new CEO was hired to help the company gain market share and cut costs, the first challenge he gave his team was to identify which products were the most profitable. However, to his surprise, it required months of manual programming and a brute force approach to get a consolidated view, because the data was spread out across multiple departments, from Finance to Manufacturing to Marketing. Even after the consolidation was complete, there were so many contradictions in the resulting view that the information

could not be trusted. The Marketing department was unable to run an effective up-sell and cross-sell campaign because it was impossible to determine with any certainty which customers had bought which products across two different divisions.

This scenario is all too common. In many organizations today, although data exists in a variety of information sources residing in various departments, with different formats, tagging, and history, the real need is to leverage trusted, relevant data across multiple departments. This challenge is heightened by continual, unpredictable changes in the uses for data across the organization. Therefore, data sources created for one purpose – say, production planning – may not be leveraged easily for other needs, such as service engineering. In addition, new business models, strategic relationships and outsourcing have increased the need to share data with partners, suppliers and customers. With all the diversity of information sources, information formats and intended uses, it is no wonder that the business need to derive more value from information is driving IT departments to devote more and more resources to managing information.

Improving Customer Service
One of the largest financial services companies in Norway needed to improve its responsiveness to customers. The company was unable to process orders and respond to customer concerns in a timely fashion because critical customer and product data was stored and managed in a disconnected way across its divisions.

Using IBM software and hardware to leverage XML in a service oriented manner, the company worked with IBM consultants to create new business processes, and improve the flexibility and reusability of important product information. As a result, the company reports that it can now handle five times as many customer orders as before, with reduced errors and substantially reduced order processing times. One license process was cut from three weeks down to 10 minutes. Response times to inquiries have dropped from as much as 36 hours down to 10 minutes. The company can now get new products to market faster and less expensively with a high level of customer satisfaction.

Challenge # 3: Information volume, variety and latency
A large insurance company had trouble managing its relationships with customers. The customer call center was overloaded with calls. It was difficult to identify the precise problems causing the customer issues, and it was often impossible to expedite the solutions. In addition, while it was possible to count the complaints and problems, management had little insight into the detail about which issues required the most attention.

The problem was not a shortage of data. Instead, it was a shortage of accurate, usable information at the right time to diagnose a problem, recommend a solution, or detect a troublesome trend.

Important customer service data was buried in disconnected databases. Data derived from transcripts of customer service calls held valuable information, but could not be accessed in an efficient manner. No one had anticipated that the vast amounts of unstructured information stored in archived customer service records or in digital media could be tapped to provide insight and direction for management. The traditional data warehouse provided a historic view of structured data but could not deal with unstructured content such as contracts, emails, images and reports. The result: poor customer service and ever-rising costs.

In this situation, as in so many others across all types of organizations, getting the right information in the right form at the right time and in the right context was critical, and also difficult to achieve without a dynamic infrastructure for multiple types of information.

Meeting the Challenges

Surmounting these challenges requires both technology and know-how. Arming an organization with consistent and reliable information requires a business-driven strategy as well as a focus on the organization's culture and the information itself. It mandates the establishment of IT and data governance processes supported by the organization that manage the flow and integrity of information throughout all areas of the business. Ensuring that business users operate within established policies is also critical.

Understanding the value of information leads to treating it as an asset. This means instituting policies to ensure better management of information over its lifecycle and establishing metrics for accountability and management of information. In taking these steps, an organization increases its ability to access and utilize information when it is most needed. As large organizations grow to understand the diversity of information requirements at the enterprise level, they will see the wisdom of increasing the flexibility of the IT infrastructure and making it more dynamic.

Building an Infrastructure for Leveraging Information

For an organization to leverage information effectively, it is not enough to focus on a single project or a single data source. Rather, the organization needs to look at the entire infrastructure of components that enable information to be used to support business requirements. The infrastructure needs to be scalable and flexible to meet changing demands. It needs to enable sharing of appropriate information with business partners and customers, and also to secure the proprietary information of the enterprise. It needs to be stable, yet flexible; reliable, yet adaptable. In short, the organization requires a dynamic information infrastructure to meet the increasing challenges of leveraging information.

IBM's Solution: Information On Demand

We now focus on the key components a company needs to develop a complete solution for leveraging enterprise information. We also illustrate how the various requirements are addressed by IBM's Information On Demand strategy and solutions in four areas – Strategy and Implementation, System Platform, Information Infrastructure, and Industry Solutions (Figure 1).
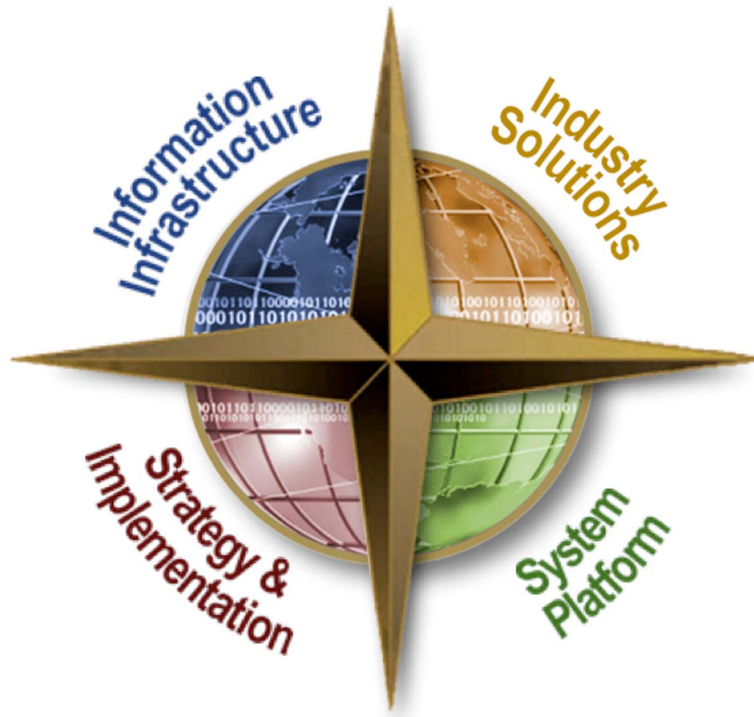

Figure 1: IBM's Information On Demand Capabilities

Strategy and Implementation

Very few organizations start with a clean slate. When management considers its information strategy, it needs to focus on the organization's goals and the role enterprise information will play in supporting them. It needs to assess the value of its existing repositories and sources of information, and consider how those sources might change and grow over time. Furthermore, the strategy is not complete unless it is based on the organization's governance policies and frameworks.

A successful strategy requires careful planning and execution, beginning with a focus on the business problem that the organization is trying to solve. For example, a company should ask questions about its information issues and needs. Are there

isolated silos of information? Are there conflicts between those data silos? Are the supporting platforms capable of providing the required service levels at a reasonable cost as the organization's needs expand? Is information stored in a way that enables management to quickly and efficiently retrieve key details? Are there business issues related to the capture and creation of information?

IBM offers services to assist organizations with information strategy as well as architectural design and the development of plans for IT and data governance. To help organizations learn from the best practices of others, IBM established the Information On Demand Center of Excellence (CoE). The Information On Demand CoE is designed to support organizations wherever they are in the information maturity cycle and to help move them to the next level by leveraging industry-specific knowledge.

IBM consultants engage with organizations to help with the planning, implementation, and management of dynamic information environments. For example, IBM resources can provide analytics and discovery services that help organizations determine the value of the underlying data. They can also provide help with server and storage optimization and migration, and help an organization understand where it is in the Information On Demand maturity model and what it will take to get to the desired level.

IBM provides a set of managed services offerings as well as flexible financing for the acquisition of any component of the overall requirement—hardware, software, or services.

System Platform
Today's enterprise needs to ensure that its system platform and infrastructure will support a dynamic, flexible and resilient information environment. The explosion in the quantity of data has made it critical for IT managers to find ways to increase productivity, control costs, eliminate downtime, and derive more processing power and speed from the existing platform infrastructure. Tools to manage and monitor security are important, particularly where a SOA environment enables an efficient flow of information between the business and its customers and partners. All system assets must be utilized to their full potential to support the business need for information that enables quick decision making and speeds time to market.

Organizations are recognizing the importance of deploying new virtualization technologies to deliver undisrupted access to data and applications. Virtualization allows multiple servers, storage devices, and other physical infrastructure components to work as one logical unit. It helps organizations to optimize the capabilities of the existing infrastructure and simplify the management of increasingly complex heterogeneous systems.

In addition to virtualization capabilities, there are other important system platform requirements that organizations should consider to support a dynamic information infrastructure. Organizations must develop and implement plans for accessing and securing information throughout its lifecycle and delivering it within the required service levels. Servers and storage systems need to be scalable. Development tools are required to ensure that databases and other information infrastructure components are designed efficiently and accurately.

IBM offerings in this area address a diverse set of needs using open industry standards. IBM servers are designed to support a wide range of power and processing requirements. Both hardware and software from IBM address customers' varying needs for a secure information environment. Storage systems and management software are available to help companies implement retention policies with storage appropriate to the value of information at different stages of its lifecycle.

In addition, organizations can take advantage of service offerings provided by IBM consultants and Business Partners to assist in implementation of their system platforms.

Information Infrastructure
Information needs to be delivered in the right business context at the right time. The relevant information must be accurate, consistent and available when and where it is needed. Through collaboration by business and IT, the company needs to develop and manage sound business processes aligned with its strategic and tactical information needs. When the company builds a strong information infrastructure based on consistent data definitions and a comprehensive strategy for managing critical information despite the diversity of

Helping Healthcare Insurance
A regional insurance carrier in the United States needed to improve customer service while introducing new and differentiated offerings. It needed a single view of highly diverse and fragmented information, from multiple lines of business, enabling managers to better research business opportunities and freeing the customer service organization to introduce new products.

Using IBM technology, the company integrated information from diverse sources, in various formats ranging from relational databases to emails, forms and documents. Implementing a new data warehouse, a new portal, and free-form searches of the information, the company improved its ability to manage healthcare costs. With better information, the company can now anticipate problems and respond more quickly to customer needs. Compliance with healthcare regulations requires fewer resources for tracking and reporting, freeing more staff members to service customers. Customers receive faster service with better results since staff members have immediate access to all information. The company now has the tools to understand market needs and expand its business more efficiently.

enterprise data sources, then business users will be able to trust the quality of the information they rely on to achieve their goals.

The foundational components of a flexible and cost-effective information infrastructure include scalable and high-performing servers for structured data. Enterprise information stored in various formats and locations needs to be analyzed, cleansed and integrated in an accurate and consistent way for initiatives such as data warehousing or master data management (a comprehensive method of enabling an enterprise to create a single source for key information), and for multiple other uses across the enterprise. XML data is especially valuable because it uses a data standard and is easily shared across applications and business partners. XML data should be stored in its natural hierarchy to preserve its unique attributes and enable easy integration with other data types.

The data warehouse – an essential component for almost all information infrastructures – must evolve to meet the increasing demands for more types of information delivered to greater numbers of users and applications without latency issues. For example, a data warehouse now needs to support real-time access to information that has been cleansed and integrated. It must provide a solid foundation for analytics including the analytics embedded right within the data warehouse. It also must deliver business insight directly to business processes. This next-generation data warehouse must be dynamic – built on a flexible infrastructure supporting a wide variety of business requirements – and must go beyond structured data to incorporate knowledge from unstructured information. Ultimately, the data warehouse must give the organization a more comprehensive view of its business environment.

In fact, since at least 80 percent of enterprise information is in the form of content such as documents, email and digital media, the organization needs to step up to

> **Leveraging Information to Fight Crime**
> One of the largest police departments in the United States was challenged by the volume and complexity of its many information systems. It renovated the management of its vast collection of crime data, providing law enforcement officials a dynamic view of this data. It can now recognize patterns within crime statistics and direct police resources where needed, in real-time.
>
> Together, the police department IT team and IBM developed a data model to optimize the integration of IT systems and information trapped in disparate silos across the city. The new Crime Information Warehouse became a single source providing access to data on all crimes committed in the city. The warehouse, deployed with IBM technology, provides law enforcement officials with access to billions of records in minutes, instead of days or weeks; allowing proactive, real-time crime-fighting. More accurate crime data leads to improved and faster decision making, increased officer safety and better capabilities for risk assessment. Because of improved crime data collection and analysis efficiencies, cases are closed at faster rates than before.

the challenge of managing this unstructured content, discovering the meaningful information it contains, and linking it to related business processes.

Deploying key applications in an information infrastructure designed for optimal performance and effectiveness can have a tremendous impact on reducing costs, increasing productivity and transforming business processes. IBM data servers use technology such as data compression to reduce storage requirements, and include hybrid support of XML, the common data interchange format important to SOA deployments. The IBM implementation of XML, called pure XML™ enables XML documents to remain in their original structure. Customers can improve search performance by optimizing XML indexes and take advantage of both SQL and XQuery to query XML data.

IBM's Enterprise Content Management (ECM) portfolio includes capabilities for discovering, managing and analyzing all types of content, and for managing risk and streamlining compliance. In addition, the ECM portfolio enables automation and optimization of content-centric business processes, combining people, content and systems to manage the flow of content-centric work across enterprises and business ecosystems. These offerings leverage information to increase process performance, reduce cycle times and improve productivity.

The IBM Information Integration Platform and Solutions provides a unified approach to leveraging heterogeneous data and content assets (structured and unstructured information) from all segments of the business. It is built on a common metadata foundation and common administration that help to simplify integration and provide trusted data to the business across diverse data environments. It supports source system profiling and analysis to help users understand data, find anomalies, validate data and relationships, and drill down for further analysis. The platform also standardizes data to improve consistency across multiple information sources. It validates, certifies and enriches common data elements like postal records; and matches and removes duplicates from data sources. This process is designed to ensure that commonalities across diverse sources can be identified and linked; and to enable survival of the best information across sources to provide a single, comprehensive and accurate view. It also transforms data to meet the needs of target systems, and delivers it to meet varied business requirements.

All organizations have core reference information that is key to their operations. To have a truly trusted view of this critical information, Master Data Management (MDM) support is required. Designed to help customers define and synchronize master information across different domains such as customer, product, supplier, account, and location, IBM's MDM offering supports collaborative, operational and analytic uses. IBM's dynamic warehousing offerings enable integration, transformation, harvesting and analysis of both structured and unstructured information, in an environment

designed to scale easily and provide information in context to users across multiple functional areas.

One of the challenges of managing information is finding the information needed for a specific purpose. To address that need, IBM offers scalable and secure enterprise search capabilities, featuring pre-built integrations for multiple content sources, as well as support for business intelligence and analytical capabilities, both directly and through its many vendor partners. The IBM platform, compliant with the open source Unstructured Information Management Architecture (UIMA), extends business intelligence by enabling text analytic solutions that uncover latent meaning, relationships and relevant facts within unstructured text.

Industry Solutions

Organizations today are struggling with reducing their deployment risks and decreasing their time to value within the constraints of their specific industries. In response, industry solutions are emerging to manage problems ranging from detecting fraudulent claims in insurance and reducing customer churn in telecommunications, to detecting crime statistics in real time in law enforcement, reducing process cycle times in banking, and improving sales and service in retail.

Delivering Trusted Information as a Service

One of the largest telecommunications companies in North America needed to find a way to identify its most profitable customers and provide them with targeted offers in a timely manner. The company was unable to access a unified and consistent view of customers across different regions because the customer data was managed in multiple disconnected data sources.

The telco used IBM Information Management software to create a comprehensive, consolidated and consistent enterprise view of customer information. Customer account numbers, telephone numbers, addresses and postal codes are now consistently recognized across all residential and business customers in all regions of the country. This information is accessed by all channels such as the call center, Interactive Voice Response (IVR), email, and Web self-service. By improving its understanding of customers, the company improved customer service, created more effective marketing campaigns, reduced customer churn and reduced development costs.

IBM offers industry-focused solutions in critical areas such as threat and fraud intelligence, customer centricity, operational intelligence, product and service optimization, and risk and compliance. These solutions leverage IBM's collection of business models in financial services, insurance, healthcare, retail, telecommunications, and other segments. They are based on industry best practices from hundreds of customer engagements.

Best practice data models can further increase time to value and reduce risk. For example, a recent Hurwitz & Associates survey of banks and insurance companies using the IBM Industry Data Models indicated that the framework of terms

and definitions provided by the Models reduced the time required for users to develop more standardized and consistent models of their own businesses. The structure and standardized approach of the Data Models helped business and IT to speak a "common language" resulting in a more accurate representation of business requirements, a more business-focused data warehouse and, ultimately, an improvement in the quality and timeliness of strategic business information.

IBM also provides Center of Excellence (CoE) programs for specific vertical markets designed to help customers move toward a solution-focused Information On Demand strategy using demonstrated best practices. In addition, IBM's extensive Business Partner network provides hundreds of products, services and solutions to help customers leverage their enterprise information. These partners often take advantage of IBM's Information On Demand infrastructure components as the foundation for their industry solutions.

Conclusion: The Customer Benefit of Information On Demand

The benefits of successfully leveraging information can be far reaching for organizations. The case studies highlighted in the sidebars of this paper illustrate some of the innovations achieved by organizations that are starting to implement strategies for Information On Demand. The shift to such a broad vision is a journey – not a project. A journey can start with small, incremental steps within a larger context and strategy. Indeed, the uses and importance of information are constantly changing with the dynamics of every industry. Organizations are at a variety of stages in their readiness to gain maximum benefit from this approach.

The wisdom of an incremental approach is clear. Organizations can gain significant value and a return on investment with each step toward the Information On Demand approach, whether that is through gaining more insight from existing data, automating manual processes, reducing compliance risk or more effectively managing storage.

The end results are equally clear. Organizations can innovate, out-maneuvering their competition. They can improve their competitiveness by reducing risk, creating process efficiencies and enhancing compliance with government regulations. Overall, organizations that leverage an Information On Demand approach can improve their relationships with their customers, paving the way for more productive, long-term partnerships. Better use of information enables business processes to be optimized so that organizations can respond nimbly to changing business conditions. Companies that leverage information effectively are beginning to enjoy these benefits of innovation and agility today.

[1] IBM Institute for Business Value, The Agile CFO: Acting on business insight, 2005, p. 7.

About Hurwitz & Associates

Hurwitz & Associates is a consulting, research and analyst firm that focuses on the customer benefits derived when advanced and emerging software technologies are implemented to solve pragmatic business problems. The firm's research concentrates on understanding the business value of software technologies, such as Service-Oriented Architecture and Web services, and how they are successfully implemented within highly distributed computing environments. Additional information on Hurwitz & Associates can be found at www.hurwitz.com.