ENTERPRISE INFORMATION MANAGEMENT:
Dawn of the Great Convergence
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Today’s business environment is complex, and it’s getting only more so. The information age may make businesses smarter and more efficient, but it also floods them with data and content that need to be managed and protected. From a regulatory standpoint, structured data and unstructured data are no different—privacy must be managed and protected, creating a need for solutions that can simultaneously manage data and content.

That’s why a holistic enterprise information management strategy is so key to success in today’s environment. To build and sustain a fully data analytics-driven business, decision makers and decision-making systems require a 360-degree view of their environment. That includes not only structured data coming in from transactional systems but also unstructured data—including documents, photos, videos and other material—traditionally available within enterprise content management repositories.

It’s only a matter of time until enterprises begin incorporating their vast stores of unstructured data into their overall analytics operations. A new generation of disruptive solutions, delivered as cloud services, is meeting enterprise needs to more closely align both forms of information. While the research clearly demonstrates that enterprises need a view of the available information assets, and that all types of decision making depend on the ability to capture, store and analyze all forms of unstructured and structured information, efforts to bring about such capabilities are still only in the early stages.

We also interviewed leading executives about their experiences and perspectives on enterprise information management. One thread stands out: Enterprise information management is a business process, and the business needs to be fully engaged in identifying and developing data and content.

This ebook explores the real-life impact of these shifting trends on organizations.

**TOWARD A HOLISTIC DATA AND CONTENT STRATEGY**

**Today’s business environment is complex, and it’s getting only more so.** The information age may make businesses smarter and more efficient, but it also floods them with data and content that need to be managed and protected. From a regulatory standpoint, structured data and unstructured data are no different—privacy must be managed and protected, creating a need for solutions that can simultaneously manage data and content.

That’s why a holistic enterprise information management strategy is so key to success in today’s environment. To build and sustain a fully data analytics-driven business, decision makers and decision-making systems require a 360-degree view of their environment. That includes not only structured data coming in from transactional systems but also unstructured data—including documents, photos, videos and other material—traditionally available within enterprise content management repositories.

It’s only a matter of time until enterprises begin incorporating their vast stores of unstructured data into their overall analytics operations. A new generation of disruptive solutions, delivered as cloud services, is meeting enterprise needs to more closely align both forms of information. At the same time, enterprises need to bring separate teams of enterprise content management (ECM) and enterprise data management (EDM) professionals into a common purpose.

Forbes Insights partnered with ASG Technologies to survey 180 executives across key industries to uncover what executives see as pressing concerns with identifying, gathering and managing information assets, and to illuminate how enterprise information management accounts for the convergence of ECM and EDM to provide a single view of all information. While the research clearly demonstrates that enterprises need a view of the available information assets, and that all types of decision making depend on the ability to capture, store and analyze all forms of unstructured and structured information, efforts to bring about such capabilities are still only in the early stages.

We also interviewed leading executives about their experiences and perspectives on enterprise information management. One thread stands out: Enterprise information management is a business process, and the business needs to be fully engaged in identifying and developing data and content.

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KEY FINDINGS

THE SURVEY UNCOVERED THE FOLLOWING FINDINGS:

• Many executives feel they do not have the infrastructure to address compliance requirements or deliver on the vision of succeeding as a data-driven enterprise. Information is siloed, obscure and out of reach to decision makers. Only 33% rate their information delivery infrastructure as “highly effective.” This leaves a lot of room for improvement.

• Most content management efforts are informal or part of other functions. Only 39% of organizations have formal content management systems, versus the database systems that are found in just about every modern enterprise. As a result, there is no single view of both structured data and content. For the most part, this unstructured data or content is not managed in the same way as structured data, yet it has the same needs for access and compliance. But it is not enough to add content management—content and data management need to be integrated to provide a single view.

• Bringing structured and unstructured data into alignment requires greater collaboration and a common vision across the enterprise. The two disciplines are coming together—36% of executives say their data and content management teams are one and the same, and another 35% report close collaboration. Close to two-thirds are pursuing enterprise information management strategies that incorporate both unstructured and structured assets; they see these types of assets as one and the same. To help this effort, a new generation of technologies now enables enterprises to manage and analyze structured and unstructured data or content within a single platform.
Enterprise Information Management at the Crossroads
Organizations are under pressure to move to a data-driven approach and be able to make business decisions based on insights from all relevant sources of information, including structured and unstructured data. At the same time, regulatory requirements call for monitoring of and access to multiple sources of information as well. However, many executives believe that their information infrastructure is siloed, obscure and out of reach to decision makers—and does not deliver a single view across all data and content.

Evolving to an information-driven enterprise provides a range of tangible benefits, executives agree. The greatest impact of information-driven decision making is seen in customer experience and internal operations. However, there is also room for significant improvement in longer-term initiatives, such as enterprise innovation and new product development (Figure 1).

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer satisfaction and engagement</td>
<td>68%</td>
</tr>
<tr>
<td>Internal operations</td>
<td>68%</td>
</tr>
<tr>
<td>Employee and manager productivity</td>
<td>66%</td>
</tr>
<tr>
<td>Sales and marketing</td>
<td>63%</td>
</tr>
<tr>
<td>Enterprise performance</td>
<td>61%</td>
</tr>
<tr>
<td>Monetization of data assets</td>
<td>57%</td>
</tr>
<tr>
<td>Enterprise innovation</td>
<td>56%</td>
</tr>
<tr>
<td>New product development/delivery</td>
<td>55%</td>
</tr>
</tbody>
</table>
There are two critical roles both structured and unstructured data are playing in transforming today’s organizations. “First, there’s the effectiveness and efficiency—understanding customers, and the ability to understand the financial performance of the company,” says Ragu Gurumurthy, CIO and CDO of Deloitte. “Second, there’s the value you create using the data exhaust from interactions with your core businesses to create new products or offers.” While most organizations understand the efficiency and effectiveness to be gained from data, only a few understand the ability data brings to create new products or business lines, he adds.

Content or unstructured data is subject to regulations just as structured data is. In matters such as state and local regulations, healthcare data privacy, the looming GDPR mandate and Sarbanes-Oxley, content is foremost on executives’ minds in terms of compliance (Figure 2).

![Figure 2: Regulations That Are Causing Concern in Compliance](chart)

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Data (structured)</th>
<th>Content (unstructured)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State or local regulations</td>
<td>48%</td>
<td>48%</td>
</tr>
<tr>
<td>HIPAA/HITECH</td>
<td>31%</td>
<td>42%</td>
</tr>
<tr>
<td>Sarbanes-Oxley</td>
<td>38%</td>
<td>42%</td>
</tr>
<tr>
<td>Payment Card Industry Data Security Standard (PCI DSS)</td>
<td>28%</td>
<td>33%</td>
</tr>
<tr>
<td>SAS 70, SSAE16</td>
<td>28%</td>
<td>36%</td>
</tr>
<tr>
<td>General Data Protection Regulation (GDPR)</td>
<td>27%</td>
<td>46%</td>
</tr>
<tr>
<td>Gramm-Leach-Biliey</td>
<td>23%</td>
<td>20%</td>
</tr>
<tr>
<td>European Union Data Protection Directive</td>
<td>21%</td>
<td>27%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>None of the above</td>
<td>17%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Things are only getting more complex. The challenge of managing and leveraging data cuts evenly across all classifications of information. The rate of annual growth for both structured enterprise data and content now exceeds 10% a year for a majority of organizations (Figure 3).

![Figure 3: Growth of Enterprise Data and Content on a Year-to-Year Basis](image)

Note: Does not add to 100% due to rounding

**Rate of annual growth for structured enterprise data and content a year**

- 13%
- 12%
- 27%
- 11%
- 2%
- 1%

**Content (unstructured)**

- 28%
- 25%
- 27%
- 11%
- 1%
- 7%
- 16%

**Data (structured)**

- 8%
- 11%
- 2%
- 1%
- 13%
- 12%
- 27%

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**Forbes insights**

**ENTERPRISE INFORMATION MANAGEMENT: DAWN OF THE GREAT CONVERGENCE**

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Only one-third of executives consider their current enterprise information management infrastructure to be “highly effective” in enabling decision makers to access the information they require, when required (Figure 4). In an era when making decisions in real time means competitive success, the ability to deliver information on demand is essential. However, if anything, the ability to get at information within minutes is far from the reality for most organizations. Less than half of executives, 47%, can tap into most of their information resources within a reasonable period of time, defined as being available within five minutes or less (Figure 5).

47% of executives can tap into most of their information resources within a reasonable period of time.
The amount of time decision makers spend actually seeking information needed for their jobs may run into hours, or even days. Only 11% of executives say they can get at information within 15 minutes. For a substantial segment, 42%, the ability to access information takes longer than an hour. In one in 10 organizations, finding the right information takes longer than a business day. In today’s real-time economy, this latency may be costly (Figure 6).

Businesses approach handling both structured and unstructured data environments similarly, says John Mancini, Chief Evangelist, AIIM International, the Association for Intelligent Information Management. These approaches include: “Let’s boil the ocean and tackle everything; let’s use our paper records experience as the framework for thinking about electronic information; let’s not worry about the cloud for now; let’s save everything for now and deal with it later.”

![Figure 6: Average Amount of Time to Discover and Access Information](image-url)

*Note: Does not add to 100% due to rounding*
Organizational issues, along with skills issues, and siloed data and outdated systems are holding back companies’ ability to deliver data as it is needed. One-third wrestle with budget issues, while close to 30% say they can’t find the essential skills needed to bring all their information resources together. Another one in four executives say information is difficult to access because they are on outdated or legacy systems. And yet one-third are unable to get the levels of funding or budget they need for more responsive systems (Figure 7).

Even the most technically and informationally proficient organizations are on a journey to understand what data is available to them, structured or unstructured. “We engaged in a three-month-long project to understand all of the data that we have, how frequently we generate the data, how frequently it’s updated, the quality of the data and the usability of the data (do we have permission to use the data),” says Deloitte’s Gurumurthy. “After 90 days of systematic work, we still didn’t have a full picture.” Deloitte is now creating a data lake to capture and categorize all its data assets.

Figure 7: Primary Challenges to Information Discovery, Access and Deployment

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget/funding issues</td>
<td>33%</td>
</tr>
<tr>
<td>Developing skills to manage content and data systems and assets</td>
<td>29%</td>
</tr>
<tr>
<td>Developing skills to utilize the content and tools effectively</td>
<td>27%</td>
</tr>
<tr>
<td>Outdated or legacy systems</td>
<td>25%</td>
</tr>
<tr>
<td>Integrating information silos</td>
<td>24%</td>
</tr>
<tr>
<td>Lack of user awareness of information resources</td>
<td>24%</td>
</tr>
<tr>
<td>Validating information sources</td>
<td>23%</td>
</tr>
<tr>
<td>Convincing data/content owners to get on board</td>
<td>21%</td>
</tr>
<tr>
<td>Lack of awareness of data available to create catalogs/glossaries</td>
<td>21%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
<tr>
<td>Don’t know/unsure</td>
<td>6%</td>
</tr>
</tbody>
</table>

Let’s boil the ocean and tackle everything; let’s use our paper records experience as the framework for thinking about electronic information; let’s not worry about the cloud for now; let’s save everything for now and deal with it later.”

JOHN MANCINI
CHIEF EVANGELIST OF AIIM

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The Tools and Systems for Enterprise Information
To help decision makers get at and analyze the information they need, many organizations have two types of systems to manage these assets: content management systems for unstructured data assets, such as videos, PDFs and Word documents; and enterprise data management systems for structured data, such as transaction files. A majority of organizations do not have formal content management systems, and it is assumed for purposes of this survey that most, if not all, have database systems. As regulations pressure organizations for greater transparency of information, a converged view is essential.

About 39% of organizations have a formal content management system, and another 23% are considering such systems (Figure 8). About one in four manage content assets (PDFs, photos and collateral material) as part of their enterprise data function, but most manage these assets informally. It stands to reason that many of these valuable information assets are not fully accessible within their enterprises, except by manual extraction (Figure 9).
Cloud computing has the potential to greatly expand the reach and capabilities of both structured and unstructured data management, especially since cloud-based services and infrastructure can support new classes of tools and data lakes. Among enterprises with formal enterprise content management systems, more than one-third, 35%, say most of their information assets are managed through a cloud service (Figure 10).

A common problem occurs as enterprises amass large volumes of data-generating equipment and applications beyond their traditional data or content systems. “That’s not the world that we come from, but it’s the world that we’re learning about as we deep dive into the data,” says Matt Meyer, vice president of digital innovations for Kloeckner Metals Corporation. One new form of unstructured data, for example, is machine-generated data. “We put in a brand-new, state-of-the-art processing system that helps us understand the efficiency, the uptime and some basic running parameters of the equipment—also some maintenance intervals and frequency of repairs. We have a lot of process equipment around the country, with different vintages.”

**Figure 10: Percentage of Enterprise Content in the Cloud**

*Note: Does not add to 100% due to rounding.*
While both enterprise data and content management systems have specific functions, there is overlap. The data most commonly found in enterprise data management systems includes customer data (53%), customer transactions (48%), contracts (44%) and workflow documents (44%). However, 28% report customer data is also found in content management systems, and 33% indicate customer transaction data is also maintained within content environments. Another 35% also maintain workflow documents within their content management systems (Figure 11). “Before analysts can use it, unstructured data needs to be structured,” says Gurumurthy. “Once some structure is applied to it, it becomes useful.”

Within content management systems, the survey revealed, the leading types of assets include photos, videos and graphics (38%), email correspondence (38%) and marketing collateral (37%). At the same time, more than 33% report they are managing these assets as enterprise data. Interestingly, 39% will manage IoT data (sensors, devices, logs) through an enterprise data management system, but 24% also see a role within content management systems (Figure 11).
Emphasis on Accessibility
Surprisingly, categories of information that one might expect to be readily available to enable company operations are often not. More than a third of respondents consider corporate inventory/stock and marketing/sales collateral difficult to access. Also, access to unstructured data or content is increasingly required to achieve greater insights on customers, markets and operations—as well as to meet compliance standards. For too many companies, this unstructured data or content—including documents, photos, videos and other material—is not managed in a way that meets these requirements.

Only 27% of executives are highly confident that their EDM and ECM systems are well-positioned to take advantage of new technology approaches and platforms in the months and years to come. It’s difficult for decision makers to get to the information they require in an expedient manner (Figure 12).

Executives are highly confident that their EDM and ECM systems are well positioned to take advantage of new technology approaches and platforms.

Figure 12: Accessability and Discoverability of Information Assets to End-Users
(Percentage leaning to “not accessible” 1-2 on scale of 1-5)

- Employee data: 43%
- Legal documents: 41%
- Customer’s Protected Information: 41%
- IT operational data/log files: 39%
- Customer Contracts and Statements of Work: 38%
- Corporate inventory/stock: 38%
- Marketing/sales collateral: 37%
- Sensor or IoT data: 36%
- Social media collateral: 34%
- Product information/schematics: 33%
- Customer transactions: 33%
- Workflow documents: 29%
- Enterprise performance: 27%
- Photos, video and graphics: 26%
- Email/correspondence: 23%
Accumulated data—both structured and unstructured—is only of value if insights can be drawn from this data for the business. Close to two-thirds of executives, 65%, are satisfied with their enterprise data management system’s ability to enable decision making (Figure 13).

At the same time, there needs to be more work to ensure more structured or unstructured data is delivered to these systems.

Figure 13: Effectiveness of Current Data Management System in Supporting Decision Making

- 39% highly effective
- 26% effective
- 21% moderately effective
- 7% moderately not effective
- 5% not effective
- 3% not at all effective
- 26% don’t know
Relatively small portions of enterprise information are accessible to analytics—only 21% of executives can report that most of their structured data is part of their analytics capabilities, and only 18% see content being delivered to these systems (Figure 14).

“We have a traditional data warehouse, which is a very structured model,” says Meyer. “Now we have to learn how to capture and organize new forms of information. Digital equipment that we’ve purchased is putting out a lot of information, and we’re trying to figure out how to analyze it and organize it in a different way, outside of our traditional data warehouse.”

Many of the tools employed for content—such as search and knowledge management—can be applied to mining and analyzing structured data, assisted by recent developments such as data lakes and Hadoop, which enable the creation of repositories for data, regardless of structure, format or origin.

18% of content can be analyzed to help decision making
Artificial intelligence and machine learning also help to scale, especially for managing the blend of structured and unstructured data, which have often employed different tools and platforms. At Cisco, for example, the greatest challenge to salesforce operations—consisting of 12,000-plus representatives and more than 6,500 systems engineers across the globe—is “managing data originating from different organizations,” says Flavio Zanetti, chief of staff, strategy and planning, digital transformation senior leader at Cisco.

With silos within the company, with different types of data, the challenge is bringing together information on equipment and software, along with product information maintained on Salesforce.com—plus records of interactions among customers, engineers and sales representatives, and any issues encountered. To address these concerns at the scale required, Zanetti’s team is turning to artificial intelligence and machine learning. Such intelligence helps manage or hand off engagements to the company’s engineering teams. Whether data is structured or unstructured, Cisco’s engineers “have to have knowledge. In order to keep scaling, we have to rely on data science: machine learning and models. We cannot afford not to do it.”

Many of the information management tools are the same, or are converging, says Mancini. “Data management and content management at scale increasingly remind me of the old Reese’s Peanut Butter Cup commercials—‘You got peanut butter in my chocolate! No, you got chocolate in my peanut butter!’ Yes, data and content each have distinct characteristics that pose unique challenges in how they are managed. But the lines are increasingly blurred between the two—you need data to optimize your content, and you need content to operationalize the insights gained from your data!”

JOHN MANCINI
CHIEF EVANGELIST, AIIM INTERNATIONAL

“Data management and content management at scale increasingly remind me of the old Reese’s Peanut Butter Cup commercials—‘You got peanut butter in my chocolate! No, you got chocolate in my peanut butter!’ Yes, data and content each have distinct characteristics that pose unique challenges in how they are managed. But the lines are increasingly blurred between the two—you need data to optimize your content, and you need content to operationalize the insights gained from your data!”
The challenge of bringing both structured and unstructured data into the analytics mainstream—and therefore a robust part of decision making—can be addressed with a new generation of technology solutions that manage all forms of data. However, this also requires greater collaboration and a common vision across the enterprise.

A majority of executives, 71%, see a close alignment between teams of professionals managing both structured and unstructured data assets. ECM/EDM teams are collaborating as one and the same (Figure 15).

71% of executives see a close alignment between teams of professionals managing both structured and unstructured data assets.
For close to two-thirds of executives, EDM and ECM are two highly integrated initiatives. At least 31% see the initiatives as one and the same, while another 34% report a high degree of overlap in key enterprise areas. Only 19% say there has been little or no alignment at this time (Figure 16).

“Executives are starting to understand the power of bringing together enterprise data and enterprise content,” says Kamran Khan, managing director and content analytics lead for Accenture Analytics. “All of this data is extremely valuable, so enterprises need to build the use cases that focus on both structured and unstructured data in order to gain better insights. Let’s bring the data and content people together and start to architect a solution that leverages both sides.”

More than anything, executives seek to open up their data and information resources. In doing so, more information in all forms can be shared and made accessible for decision making. They also seek a wider breadth of capabilities and scope for their content management capabilities (Figure 17). The key to bringing this all together is embracing an information-driven culture that leverages the power of analytics.

Executives are starting to understand the power of bringing together enterprise data and enterprise content. All of this data is extremely valuable, so enterprises need to build the use cases that focus on both structured and unstructured data in order to gain better insights. Let’s bring the data and content people together and start to architect a solution that leverages both sides.”
Meyer has been active in transforming Kloeckner Metals—part of an old-line industry that relied on manufacturing and shipping goods—to an information-driven enterprise. Part of the formula for this is making data easy to access and freely available to all departments as privacy considerations allow, and making increased use of the unstructured data coming in from the Internet of Things and sensors. For example, Kloeckner has started integrating RFID (Radio Frequency Identification) capabilities, which enables managers to better understand the flow of materials, personnel and machines. “One of our strategic goals is to drive 50% of our revenue through digital means,” Meyer says.

From Khan’s viewpoint, however, we are still in “the early days” for data and content management teams coming together, but both sides understand this convergence is essential. “Twenty percent of the data in any enterprise is stored in structured form, but 80% is in unstructured form. Currently, data managers aren’t getting that 360-degree view of their organizations by solely focusing on the business intelligence that’s found inside their structured data. There’s value in merging the two in order to gain a holistic view.”

### Figure 17: Steps Being Taken to Promote or Encourage Increased Collaboration and Insights

| Implement new types of collaboration technology | 28% |
| Develop more of an “open data” approach or platform for non-sensitive information | 25% |
| Explore new organizational reporting structures | 24% |
| Expand the scope and capabilities of ECM systems | 24% |
| Enable greater access to data and insights through mobile devices | 24% |
| Revise incentives and performance criteria | 23% |
| Expand the scope and capabilities of EDM systems | 20% |
| Reach out more to external partners, content producers, developers | 14% |
| Other | 1% |
| None | 8% |
| Don’t know | 8% |
CONCLUSION: TOWARD A SINGLE FORCE OF TRANSFORMATION

Enterprise data management and enterprise content management both serve a common purpose—to find, understand, trust, share and govern both structured and unstructured data assets to deliver insights that will move businesses forward by understanding the customer. In addition, increasing regulatory pressure means business decision makers need a broader view of all data assets and greater transparency with data. That’s why enterprise information management needs to be addressed as one single category, one single force of transformation for today’s enterprises.

There is no time to waste. In today’s environment, disruptors are applying a range of data to understand and serve customers in new, and often groundbreaking, ways. Enterprises already have the data resources they need to compete. Unstructured data assets—the documents, files, videos and other content that exists across enterprises—are a vast, barely tapped resource for analytic insights. Enterprises are only just beginning to reach out to bring this type of data into their analytics applications. They are challenged with building out new types of infrastructure to meet these requirements, as well as to leverage this data. The rewards of doing so are substantial, leading to increased growth, profitability and customer satisfaction.

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• FLAVIO ZANETTI, Chief of Staff, Strategy and Planning, Digital Transformation Senior Leader, Cisco Systems
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