

Cutting the Clutter:
*Tackling Information Overload
At the Source*

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Executive Summary

- ▼ Each year the amount of information *created* in the enterprise, paper and digital combined, grows faster than 65%.
- ▼ Non-productive information work, such as reformatting documents or reentering documents into computers, consumed more than \$1.5 trillion in U.S. salaries last year.
- ▼ Survey respondents spend as much as 26% of their time trying to manage information overload.
- ▼ Respondents split their time evenly between dealing with paper and digital information, but 71% prefer to deal with digital information.
- ▼ The amount of time U.S. information workers spent last year managing paper-driven information overload cost \$460 billion in salaries.
- ▼ Respondents whose companies do a good job managing information overload rate technology as a significant help.
- ▼ Reducing the time wasted dealing with information overload by 15% could save a company with 500 employees more than \$2 million a year.

In these difficult economic times, when resources, capital, customers, and outside investment are tough to come by, one commodity isn't: information.

The amount of digital information created in the world – from emails and instant messages to customer records, digital phone calls, compound documents, photos, blog entries, Web pages, podcasts, video streams, and so on – will grow 10-fold in 5 years.ⁱ

During this same time, despite the digital tsunami, the amount of paper produced in the world will grow an inexorable 2% a year, passing 41 trillion pages in 2009.ⁱⁱ The output from electronic printers, scanners, fax machines and copiers alone will total more than six trillion pages.

Combined, the total paper and digital content in enterprises, governments, schools, and small businesses around the world will grow 67% a year between now and 2012.

Growth like this is both impressive and scary. IDC estimates that the worldwide number of information workers, about 1 billion in 2008, is growing slower than 3% a year. No wonder a search on Google for the term “information overload” yields more than 1.7 million links.

What's to be done? Are we doomed to run through our work days on an accelerating treadmill of documents, emails, mes-

sages, spam, and lost information? Are we facing insurmountable odds in the war on information overload?

No.

Information overload is not a monolithic problem. Instead, it is a kaleidoscope of intersecting smaller problems – information growth, information diversity, business process response times, human to information interactions, and information technology. It can be dealt with piece-meal, one process, one workflow, one application at a time. At this granular level, there are solutions.

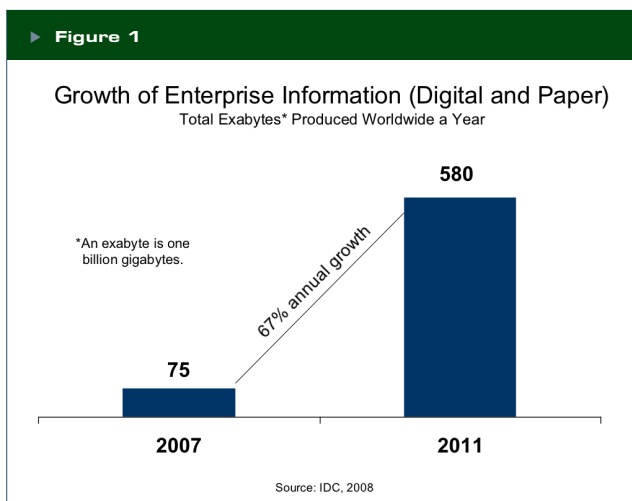
Key findings

To better understand *how* organizations can deal with information overload and information clutter, Xerox Corporation, a long time leader in research of information usage and a member of the Information Overload Research Group (<http://www.iorgforum.org/>), asked IDC to apply its analytical and predictive power, along with some fresh survey research, to this topic. In summary, we found:

- ▼ There is a wide variance in the degree to which information overload affects workers. Employees at companies that manage information well are one-third as likely to suffer severe overload as their peers at other companies.

- ▼ One symptom of information overload is the inability to get the right information to workers at the right time; 40% of those surveyed said they had the information they needed less than 75% of the time.
- ▼ Information overload is as much a problem of information diversity, or clutter, as it is of quantity; 60% of respondents rated dealing with too many different types of information a bigger problem than dealing with too much information.
- ▼ Dealing with information clutter exacts a toll on organizations. Nearly half of the respondents said they spend more than 25% of their time managing information overload.
- ▼ Although email is the information type workers deal with most frequently, paper documents are a close second. Respondents dealt with almost as much paper-based information (48%) as digital (52%) – and were more likely – by a two-to-one margin – to blame paper-based information for their overload, rather than digital information.
- ▼ The boundary between paper and digital information is porous. More than half of printed documents get keyed into computer applications, and more than 40% of digital documents get printed. A quarter of the time these printed digital documents get reentered into computer applications.
- ▼ Technology is seen as one clear way to address the information overload/clutter problem, with 35% of the total sample – and 70% at companies that manage their information well – rating technology as very helpful (8-10 on a 10 point scale).

Given this intersection of paper and digital benefits, the advan-



tage of managing them together – given the time and energy workers expend wrestling with both – range from improved productivity and better access to information to shorter sales cycles and faster order processing.

There is no miracle cure for information overload, but it is clear that attacking the problem at the interface between paper and digital information is an excellent place to start.

Groaning under the weight

The relentless growth of information is real. IDC sizes the amount of new digital information *created* each year– never mind how much is archived, printed out on paper, or otherwise kept around year after year – and the growth is astonishing.

Figure 1 shows the rapid growth of total digital *and* paper informationⁱⁱⁱ produced in enterprises in 2007 and projected for 2011.

This rapid growth obscures another fact – that this information is incredibly diverse, coming in types as varied as documents, forms, CAD drawings, emails, instant messages, and data base fields. More than 95% of this information is unstructured, meaning it is not easily described or catalogued automatically. This makes finding the right information at the right time incredibly difficult.

Also, the growth figure doesn't adequately describe the amount of information already in the organization. Just think of paper. Given the number of pages of paper entering the enterprise and the number of pages that end up stored in files and boxes for years, IDC estimates that there are more than 100,000 pages of paper per information worker in the workplace.

Dealing with all this information flowing in the enterprise takes its toll. In a landmark study of the costs of information work,^{iv} IDC charted the time spent by information workers doing more than a dozen normal tasks, from reading and writing emails to creating documents. Study results indicated that time-consuming and non-productive activities could chew up as many as 20 hours a week per worker. The activities included:

- ▼ Reformatting from multiple formats to a one document format
- ▼ Searching for but not finding information
- ▼ Recreating content
- ▼ Publishing the same content to different audiences using different applications
- ▼ Moving documents from one format to another
- ▼ Acquiring archived records with little or no automation

▼ Dealing with version control issues

Figure 2 shows the time spent on these activities. Note that all of them are amenable to content management, workflow, and digitization solutions that are available today.

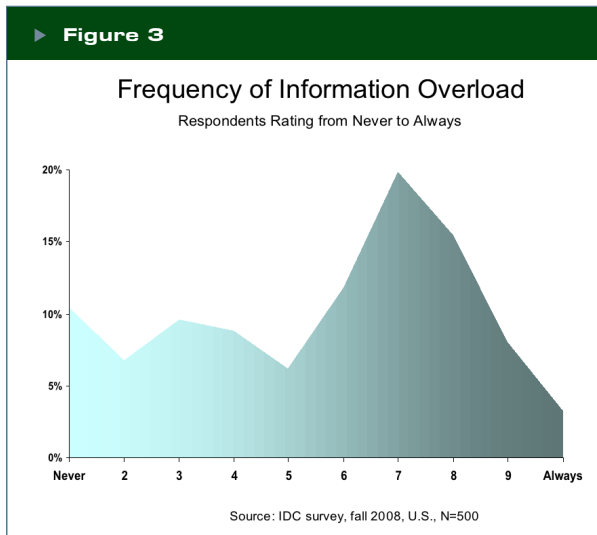
Apply those stats to the U.S. information worker population and you get an amazing total of time wasted in 2008 – time worth \$1.5 trillion in salaries!

Cutting the wasted time by just 15% through automation would save U.S. enterprises more than \$270 billion. For a company with 500 information employees, that amounts to more than \$2 million a year.

Measuring the beast

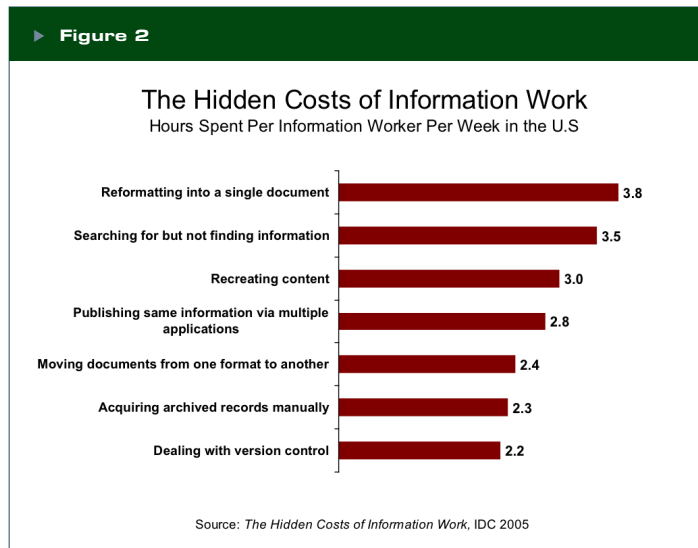
How bad is information overload? In a global survey IDC conducted last year, we found that 75% of workers in more than 1,000 large organizations said they suffered from information overload. Of those, 45% said they were “overwhelmed.”

In the U.S. research conducted late last fall for this white paper (see *Methodology*), we found similar results. Figure 3 shows how often respondents suffer from information overload. Nearly 60% said more than half the time.



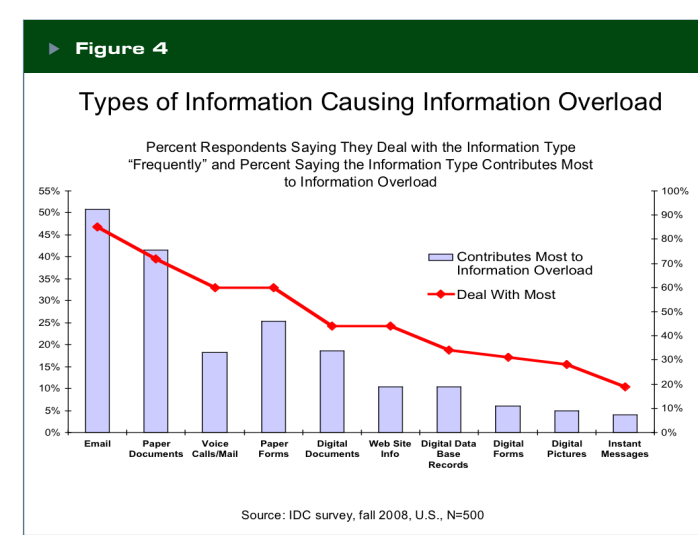
What causes this feeling of information overload?

As Figure 4 illustrates, respondents deal with a plethora of information types. In general, the more they deal with an information type, the more it creates the feeling of overload. Figure 4 is a bit complex, but the line indicates the frequency of dealing with an information type, and the columns the degree to which those information types contribute to information overload.



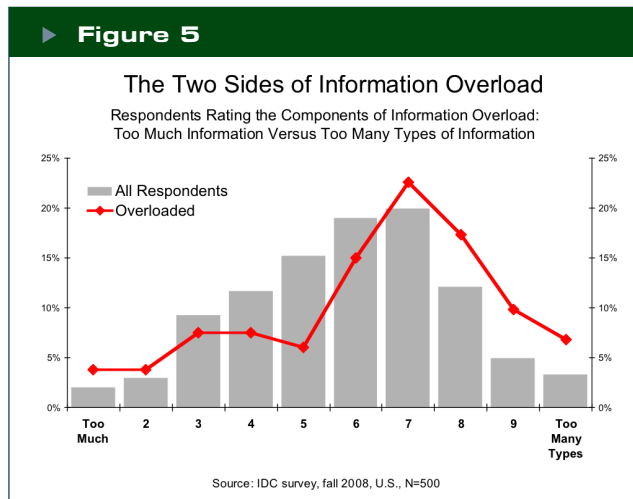
Comparing the two measures you find that:

- ▼ With respect to how much they are used, email and paper documents create more information overload than the other types, and
- ▼ Paper generally creates more information overload than digital information.



Information overload is not just about the growing mountain of information. It is also about the growing diversity of information. The old information types never seem to go away – paper forms, documents, drawings, data base output, emails, faxes, files and records, and phone messages. Meanwhile, new forms have sprouted, from text and instant messages to blogs, wikis, social networks, podcasts, digital images and sounds, and even digital “stickies.”^V

In fact, when we asked respondents which was worse – the quantity of information they had to deal with or its diversity – diversity won (see Figure 5).



And for those who suffered the most from information overload, information diversity scored even higher.

There is one more dimension to information overload: interruptions caused by this profusion of information types.

According to the company Basex, which studies information overload and hosts the Information Overload Research Forum, U.S. workers spend more than 25% of their time dealing with interruptions and distractions.

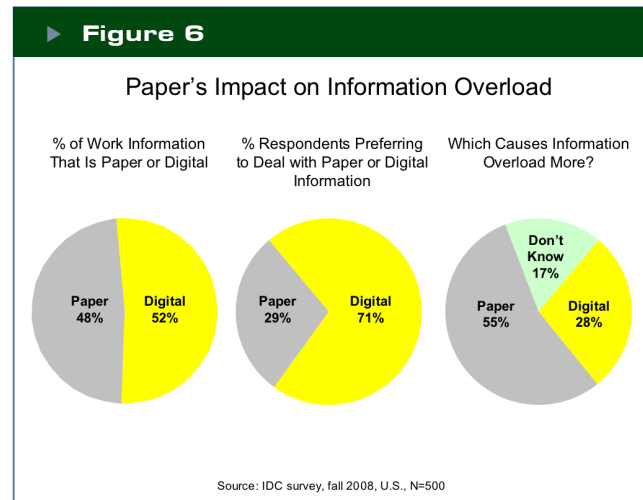
Our own survey respondents said they spent as much as 26% of their time “trying to manage information overload.” Those hours worked wrestling with information overload translate into a salary cost of \$960 billion to U.S. organizations in 2008. For a company with 500 information workers, that’s more than \$7 million dollars a year.

Walls of paper

If you count the amount of organizational information *created* each year in terms of gigabytes, the amount of paper-based information represents less than half of one 1% of the total, if all paper documents or images were converted to their digital equivalent.

But physically, all this paper is imposing. Each year the enterprise receives a weight in paper equivalent to the weight of its information workers. It stores as much as an additional ton per worker in files, repositories, libraries, and desk drawers.

Figure 6 shows what respondents said about the relationship of paper to information overload. It’s simply this: they deal with



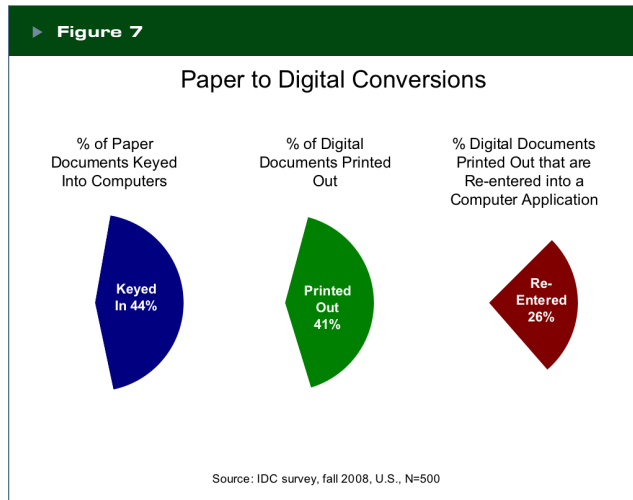
paper about half the time, but would prefer to deal with digital information *most* of the time.

In our survey, we also asked an open ended question of respondents about the one thing their companies could do to reduce information overload.

Ranked by popularity, the responses fell into these general solutions:

1. Digitize information and eliminate paper (30%). This included cutting down on documents, but excluded simple upgrades to existing computer systems.
2. Be better organized (15%). These were either responses that actually used the word organized or implied better organization, such as filing better or prioritizing. It could be organizing either paper or digital information or both.
3. Nothing (12%). Here there were two flavors. Either there is nothing that *can* be done, or nothing that *needs* to be done, about evenly split.
4. Reduce copying or unnecessary conversions (10%). This could be paper or digital copying, sending emails to unnecessary recipients, archiving too much useless paper, or switching between systems.
5. Implement a central repository (5%). This meant putting information into one place (paper or digital) and making it more accessible.
6. Fewer emails (5%). Cutting down the number of unnecessary emails, shortening them, and improving filters.
7. Other (22%). A lot of these responses referred to technology upgrades, more staff, better training, and other organizational actions.

The conversion issue, the fourth listed, is no small matter. Figure 7 shows the amount of time digital information is printed out, paper information is entered into computers, and the amount of time information goes from computer to paper to computer.



Just consider the time spent keying paper documents into computers and converting digital output that has been printed out back into computers.

Based on the study referenced above (*The Hidden Costs of Information Work*) and the time our respondents said they spend managing information overload, just managing the paper side of information overload can equate to five hours a week, or labor that costs \$460 billion in the U.S. in 2008. If only 20% of that time is dealing with conversions to and from paper, that's nearly \$100 billion.

Tackling the problem at the source

Figure 6 makes it clear that while the information growth behind information overload is primarily digital, the hassle of dealing with paper, or with paper *and* digital information, is a significant if not the major contributor to the "overload" in information overload.

It need not be.

There are plenty of solutions available to ease the burden of dealing with paper and to automate digitization, from simple network-based management and customization of scanner and multifunction device output, to creation of information repositories and enterprise workflow and content management systems.

Within the Xerox customer base itself are myriad examples of companies that have benefited from reducing the friction inherent in dealing with both paper and digital information. These range from very large customers, like Dow Chemical (see sidebar) to midsize, like the Baptist St. Anthony's Health System in Amarillo, Texas, (see sidebar) and small, like the Widdowson Group, a 350-employee logistics company in the U.K (see sidebar).

But where to start?

IDC has studied the information management, workflow, content management, and hard copy management markets for years. No single answer fits all companies, all size classes, or all industries.

For instance, in a large online survey of the U.S. hardcopy market in 2008, IDC found that the top ranked business processes needing automation was accounting, billing, and finance – an area that generally costs less than 5% of company revenues. See Figure 8.

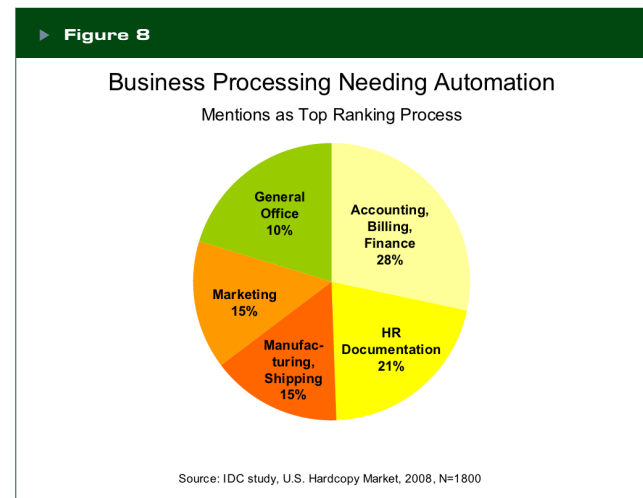


Figure 8 shows the generic answer to the question of where to start, but there were big variances by industry. Core industry applications often rose to the top – financial applications in banking, health records in health care, drawing and designs in manufacturing, and general paperwork in government.

Areas that produced the most paper output from their information system seemed to be accounting and finance, administrative and executive departments, marketing, and customer support.

Our research also indicates that some industries are more prone to information overload than others. Figure 9 shows the variance among our survey respondents in their share of the

Success From Listening to the Voice of the Customer

When industrial giant Dow Chemical, with the aid of Xerox Global Services, embarked on a project in 2004 to centralize printing, copying, faxing, and scanning functions across 333 sites and 1,700 buildings in 49 countries, it began with a detailed study of user needs through surveys, group sessions and interviews.

This user feedback was incorporated into the entire planning and deployment stage and helped drive the analysis of features and configurations any enterprise-wide system would need to have. The project team called this the “Voice of the Customer.”

From this analysis the team was able to isolate features and requirements that were absolutes, such as print quality, from those that could drive user satisfaction (e.g., error free operation and physical proximity) or those that could only improve customer satisfaction if the first two types of features were in place. An example of the latter was maintenance free operation.

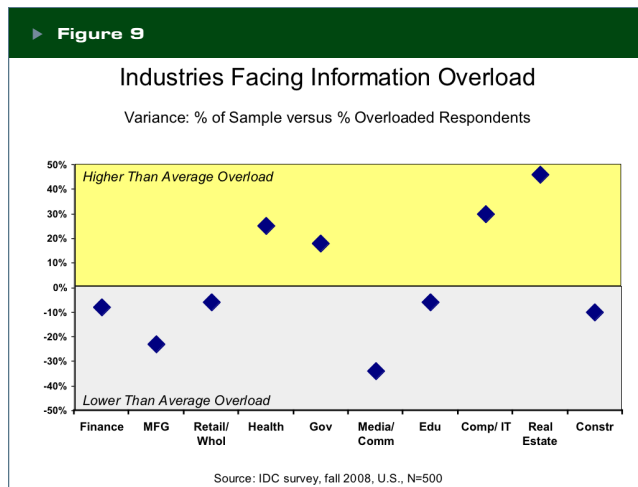
By 2005 the Dow’s IT team was ready for the nuts and bolts of kick-off and deployment. They started with education (i.e., selling the benefits of the project) to executives, and then began a continuous process of reaching out to the rest of the 42,000 employees. Messages to employees took the form of Intranet postings, emails, video clips, and active communication with more than 2,000 affected work groups.

(Of course, the team also implemented all the normal disciplines of good project management – clear goals and objectives for the project team, liaison with local IT teams, and substantive vetting of suppliers.)

The results? The consolidation of 16,000 devices to 5,500, proactive problem management across the enterprise, and \$20-\$30 million in cost savings over five years (two years already realized).

sample and share of overloaded respondents.

There are no real surprises except perhaps the level of information overload experienced in the IT sector, and the low stress level in finance and construction.



Less paper, more money

The costs of managing information overload and dealing with paper-to-digital conversions ought to be motivation enough to look for ways to automate information flows.

In the large survey we conducted on the U.S. hard copy market, we found that the drivers to implement new scanning solutions, ranked in order, were:

1. Make information accessible
2. Reduce costs
3. Increase employee productivity
4. Reduce process time
5. Reduce human error
6. Replace facsimile-based systems

Depending on the industry, there were other motivators as well, such as meeting compliance standards or improving customer satisfaction.

In our more recent survey, we asked a similar question, but looked at the specific benefits from better integration of paper

▶ CASE STUDY

A Helping Hand Dealing with Chaos

The Baptist St. Anthony's Health System, based in Amarillo, Texas, is an award winning health provider; named among America's Best Hospitals by *U.S. News & World Report* for five straight years and recipient of the 2007 and 2008 Distinguished Hospital Award for Patient Safety.

The organization has always seen technology as a key component of quality health care, but a few years ago, after a series of mergers, it found it had a problem managing its paper flows. A mélange of equipment – printers, faxes, copiers – from a mélange of suppliers made integrating documents impossible and maintenance a nightmare. A system for tracking and economizing on supplies and paper simply didn't exist.

But, if the hospital wanted to build a foundation to migrate to an electronics medical records system to improve productivity and HIPPA compliance, it had to do something.

The health system engaged Xerox Global Services to bring order to chaos. Xerox built a world-class document production and management service, and while doing so handled day-to-day management of the hospital's fleet of copiers, printers, and faxes. It developed a hospital wide system for tracking consumables and standardized forms, and switched to print-on-demand. The new system includes bar code tracking of documents and medical records.

By maximizing the MFP devices across multiple locations the health system lowered the cost per impression of hard copy output, saving \$200,000 in the first year. Machine service response time dropped from days to under 30 minutes. Outside printing costs were cut 90%, saving another \$300,000 a year, and the printing center now produces high quality collaterals for other companies.

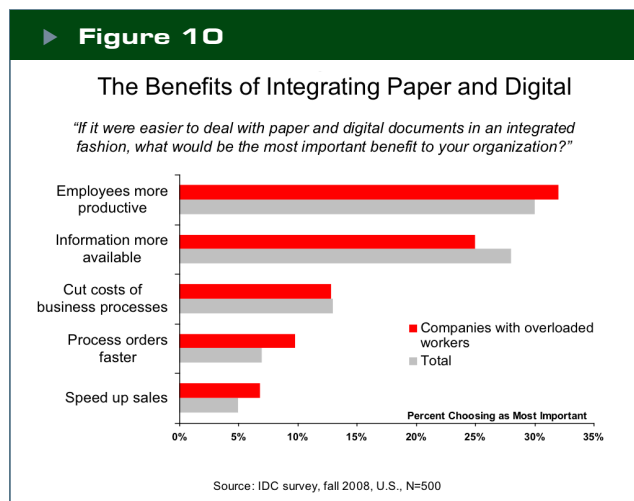
Baptist St. Anthony's found, as its patients do, that sometimes it pays to see an expert.

and digital information. The results are shown in Figure 10.

For companies suffering from information overload, the message is clear: There is immediate gain, low hanging fruit in better integration.

This is not a wish list. Respondents to the survey told us that if their interactions with paper were eliminated entirely, they could save 40 minutes a day on average. Companies whose respondents most suffered from information overload could gain an additional 48 minutes.

▶ Figure 10



Learning from the leaders

In our survey there were significant differences in benefits and behavior between average respondents and those that worked for companies they rated as leaders in dealing with information overload.

(Companies ranked as leaders were rated by their employee respondents, about 30% of the sample, at 8-10 on a scale of 1-to-10, where 10 was the high score in "managing information overload." Companies *not* doing a good job were rated from 1-3, about 12% of the sample.)

Comparing the two groups – leaders who managed information overload well and laggards who did not – we found that leaders:

- ▼ Were more likely to find information they knew their

company had – 56% were able to find such information more than 90% of the time, compared to only 20% of the laggards.

- ▼ Had better integration of paper and digital information – rating their agreement with the statement that their companies had appropriate integration at 3.8 on a scale of 1-5 (5= highly integrated) versus a score of 3.4 for the other group.
- ▼ Did less needless archiving – rating agreement that their companies didn't archive needlessly at 2.2, versus 1.6 for the other group.
- ▼ Were more likely to have information when they needed it in the form they needed it – rating their companies at 2.6 on a scale of 1-5, where 5 is the best possible score, compared to 1.6 for the other group.

But perhaps the biggest difference was in their attitude toward and reliance on technology.

Figure 11 shows the response to a question about whether technology is a hindrance or help in dealing with information overload.

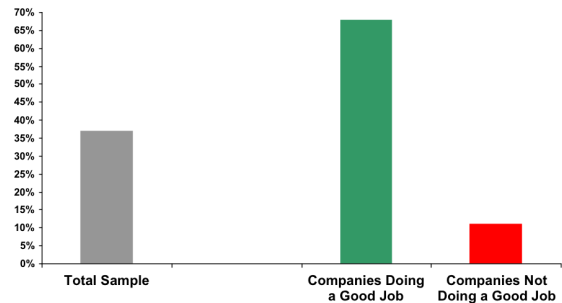
Call to action

The research is clear. Information overload and information

► **Figure 11**

Degree to Which Technology Is a Help or Hindrance

Percent Respondents Rating 8-10 on a scale of 1-10, Where 1= "Hinders" and 10 = "Helps"



Source: IDC survey, fall 2008, U.S., N=500

clutter are enterprise-wide problems and are caused by both paper-based and digital information. Dealing with these problems will absolutely require the astute use of technology.

Case study results and other IDC research point to the importance of:

- ▼ Tackling one component of the problem at a time – and building from there. Perhaps it begins with a hard copy equipment consolidation project or the automation of

► CASE STUDY

A Small Project with Big Benefits

To the Widdowson Group, a 350-employee U.K. logistics company, a small piece of paper was creating big problems.

It was the proof-of-delivery slip, the document that verifies that Widdowson delivered goods to their customers. The company would scan 300-500 delivery slips a day, each scan taking 3-5 minutes, the attention of a full-time employee doing the scanning, and four administrators indexing the proofs. As business grew, it became harder for Widdowson to keep up.

Working with Widdowson's content management system provider and a scanning software company, Xerox Global Services deployed a turnkey system that automated the scanning function – using Xerox Phaser color printers and a Fujitsu color scanner.

The color scanner reads the delivery slips barcodes with 99% accuracy, and 95% of forms are put online in a matter of hours. The project only took three months to implement and Widdowson expects to see payoff within two years from lower staff costs and improved efficiency. Since the project was completed, the number of customer calls about the delivery slips has dropped to zero. Scanned documents are stored digitally and the originals sent back to the customers.

Widdowson also updated the way it manages its HR documents – entering them onto an Intranet and allowing employees to access personal information from kiosks around the company. Traditional paper-based processes, such as vacation requests and ordering uniforms, are now handled online. Today the company prominently refers to its use of technology as a customer advantage on its website.

► The Benefits of Color

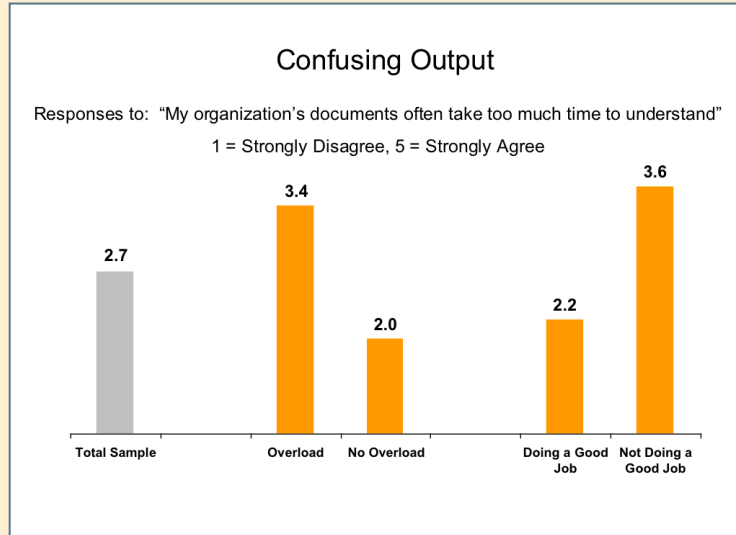
The benefits of color as an aid to information recall have been studied for decades.^{vi} The advantages are clear, especially if color is used correctly. For many information tasks, color provides measurably more impact on the reader of a document, brochure, or even email. And with the costs of color printing – printer, paper, ink, maintenance – more affordable through tools like the Xerox Phaser 8860 color printer and solid ink technology, the cost differential between color and monochrome is narrowing to close to a penny a page.^{vii}

And none too soon.

In our survey of U.S. information workers we found a surprising number who said their organization's documents were hard to understand – both internal and customer-facing. Those who most strongly agreed that their organization's documents took too much time to understand were those who suffered the most information overload -- and felt their companies were not doing a good job managing information overload.

The issue may not solely be color – there is a lot of turgid prose, jargon, and bad writing in government and business – but color can be one component of a solution.

Another solution is reworking customer communication for easier call to action and recall. This has the advantage of not only improving customer satisfaction but of also lowering calls to support centers from customers with a poor understanding of the action required or of the information presented.



a single business process. Then it extends to workflow management that integrates paper and digital forms. And so on.

- ▼ Carefully examining the business case. It might start with an audit of paper forms and projects to cut down on redundant information collected. Then onto an information repository. And so on.
- ▼ Looking for low-hanging fruit. It might start with eliminating the hand-entering of printed information into computer applications. From there it might extend to integrating scanning into daily computer applications and managing them centrally. And so on.
- ▼ Engendering the support of the enterprise. This could involve new policies on email message etiquette, or inter-de-

partmental support for a new document workflow. Then on to a process for continuous monitoring of user needs and solicitation of direct feedback. And so on.

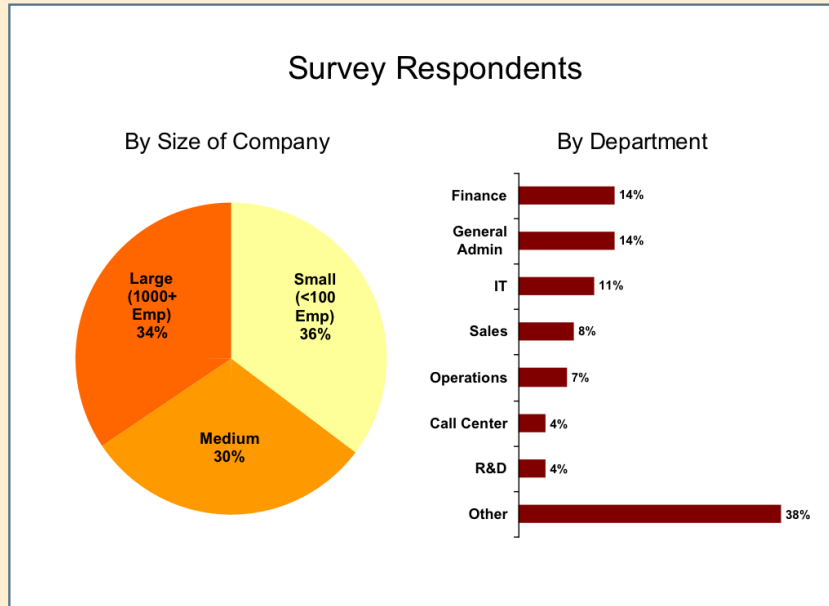
- ▼ Working with a trusted vendor – like Xerox, with the R&D and experience that can bring the lessons of many other similar projects to bear on yours. This could start with a departmental project, and then extend to an outsourcing engagement. And so on.

These are difficult times to get *any* project funded. The good news is that information overload and information clutter are all around us, meaning there are almost limitless opportunities for improving overall employee productivity and business efficiency. A small investment can quickly lead to a large benefit. In any economy that's good news. In this economy, it's better news.

The information in this white paper comes from a number of sources, although IDC is chief among them. For the survey component we conducted an Internet-based survey of 500 information workers in U.S. businesses. Although the responses were not weighted by company size or department type, they came out remarkably representative of the U.S. workforce.

One segmentation we found useful was to separate respondents into those who worked for companies that they felt did a good job managing information overload (rated 8-10 on a scale of 1-10) and those who rated their companies poorly (1-2).

Another segmentation was the portions of the sample least and most suffering from information overload (1-3 or 8-10 on a scale of 1-10, with 1 = never and 10 = always).



ⁱ *The Diverse and Exploding Digital Universe*, IDC 2008, a White Paper sponsored by EMC.

ⁱⁱ Estimated for 2009 using UN statistics on pulp and paperboard (FAOstat, 2007), and OECD Environmental Impact Report, 2005-2006. Includes magazine (coated paper), newsprint, and printing and writing paper; converts metric tons to equivalent sheets in A-4 size.

ⁱⁱⁱ Paper information in gigabytes is computed using the page counts developed using the statistics referenced in the previous note and applying a standard 1,500 characters a page. Thus, the estimate may underestimate the gigabytes of images and overestimate other information form factors. Because the numbers for gigabytes of digital information are so huge, an error of an order of magnitude in either direction for this estimate of paper-based information would have no impact on the combined growth rate.

^{iv} *The Hidden Costs of Information Work*,² Feldman et al, IDC March 2005, IDC #05C4405A

^v The term refers to a class of information that links physical objects via a special bar code (a “stickie”) with embedded URLs or Internet addresses (for example, a Wikipedia page) that can be “read” by mobile phones with the appropriate software.

^{vi} For example, see *An Experimental Program Investigating Color-Enhanced and Graphics Information Presentation*, Izak Benbasat, Albert S. Dexter, Peter Todd, University of British Columbia, Communications of the ACM, November 1986. Or, more recently, *Impact of Color on Marketing*, Satyendra Singh, Management Design, 2006 or *The Culturally Customized Web Site: Customizing Web Sites for the Global Marketplace*, Nitish Singh and Arun Pereira, Elsevier, 2005.

^{vii} *A New Business Model for Color Printing: A Color Cost per Page that Rivals a Black-and-White Cost per Page Lifts the Final Barrier to Color Adoption and Usage*, an IDC White Paper, Keith Kmetz, October 2007, IDC #209013.

^{viii} *IM=Interruption Management? Instant Messaging and Disruption in the Workplace*, R. Kelly Garrett, School of Communication, Ohio State University, and James N. Danziger, School of Social Sciences, University of California, Irvine. Published by the International Communications Association, 2008.

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